MODEL AIRPLANE NEWS

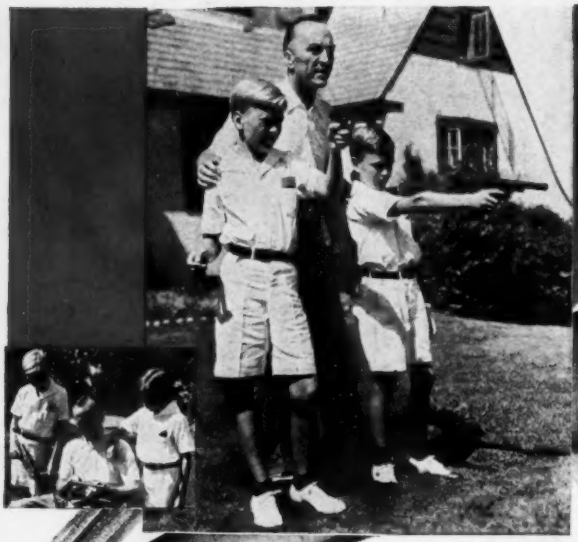
9th Year of Publication

DECEMBER

1937

20c

The Folkerts' Racer



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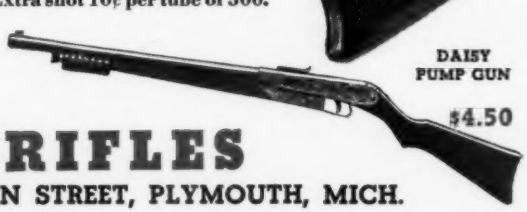

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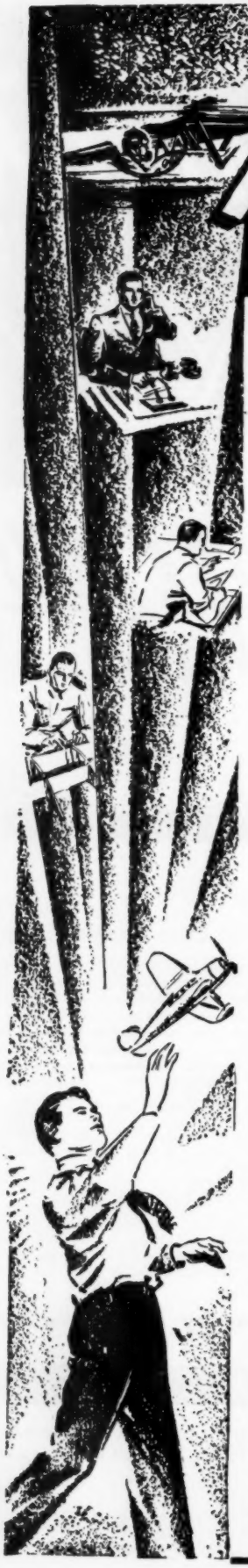

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9th YEAR OF PUBLICATION

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Edited by Charles Hampson Grant

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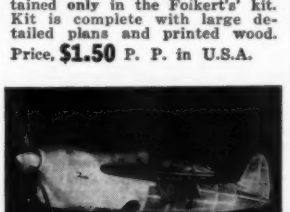

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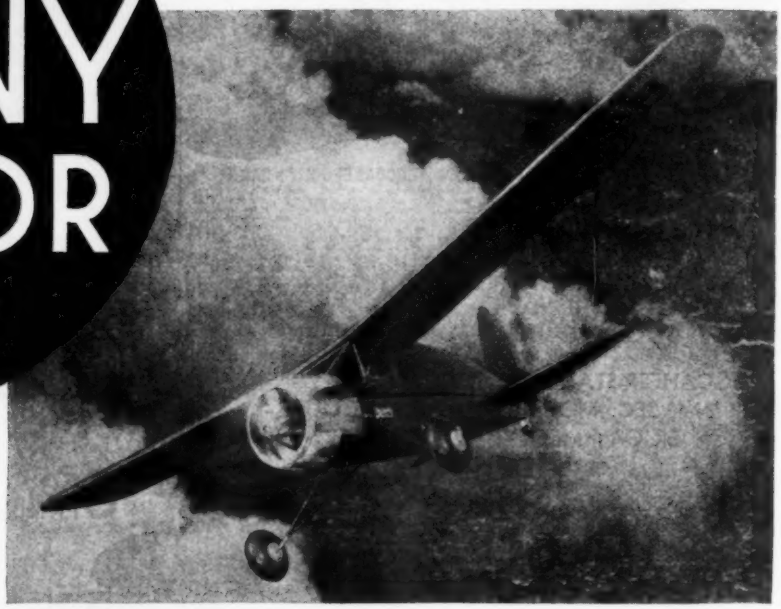
1938 Model



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SPECIAL OFFER—Denny Jr. Kit and Dennymite Motor Ordered Together	**$25.00**
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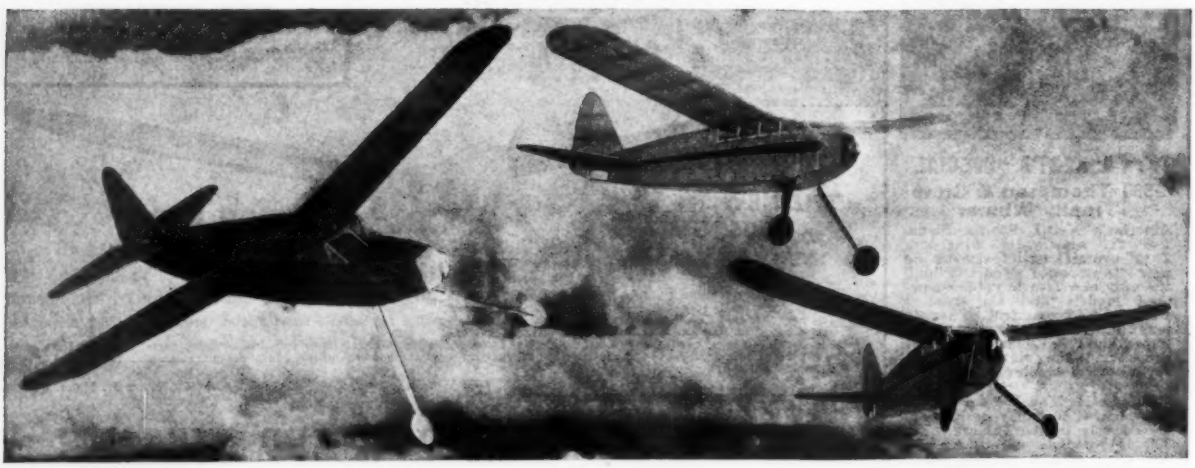

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All Dennymites are factory tested and sold with coil and condenser mounted on dural mounts, ready to install. The new Champion spark plug is standard equipment. Merely attach propeller and hook up battery and you are ready to run. The unit is positively GUARANTEED against defects in materials and workmanship. Sold only as an assembled unit.

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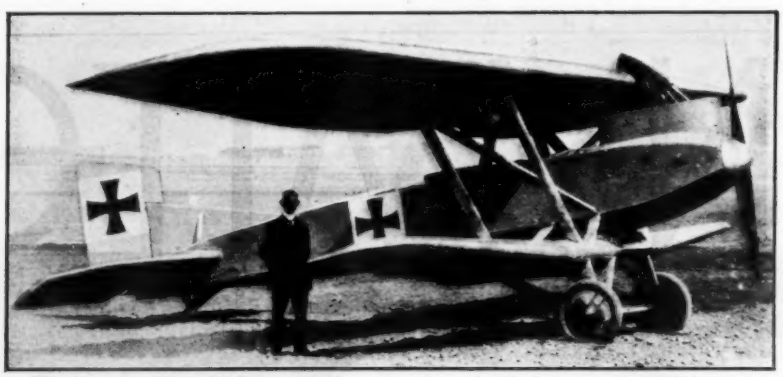


The heavy wartime Junkers ground attack plane, sheathed in armor. (Williams)

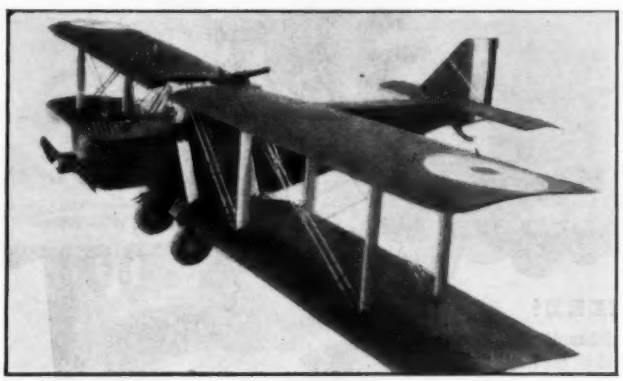
The Story of The Attack Airplane

How It Has Developed From the Ponderous Armored Type to the High Speed Multi-Gun Ship of Today

By GORDON S. WILLIAMS

SINCE its inception during the World War the attack plane has seen many varied changes. Although most countries today have no specialized section of their air force which corresponds to our attack section they make use of this important branch of aerial warfare in no small manner.

The war saw the development of two distinct classes of attack aircraft, the armored and un-armored, both of which saw some use before the armistice. Probably the most interesting of all such ships of this period was the giant Junkers "Flying Tank" attack ship of all-metal structure. Ground attack planes were also made by both Halberstadt and Hannoveraner for the central powers, while the Sopwith "Salamander" was England's most important plane in this category. The attack plane of this period relied more upon invulnerability than on speed and had all vital parts heavily sheathed in armor. It will be seen in the following story how this method became obsolete in a very short length of time and how the present day attack planes came into being.



The early Boeing GA-2 with Engineering Division W-18 engine. Note cannon and machine-gun between the wheels. (Boeing photo)

The main task of the attack airplane, is, of course, the attack and strafing of ground troops and concentrations with gunfire and bombs. Attack aircraft are also used as low altitude bombers in some cases. A low-flying high speed airplane is a very difficult target to shoot at as it can change position so quickly that gun crews are virtually at its mercy. Large squadrons of these "ground mowers" fly in such a formation that the concussion of exploding bombs from preceding machines will not affect the following planes. In this manner a large area may be effectively covered, with safety to the airplanes.

Maneuverability, next to speed, is probably the attack plane's paramount quality as it must be able to follow the terrain at a very low altitude so as to escape detection until upon its target. The low-wing type has dominated the American attack design picture for a number of years and seems likely to stay in this place for some time to come. Some may argue that the low-wing blots out visibility in the essential direction, downward, but when we stop to consider that the plane is moving at around 200 miles an hour it is easy to see that visibility ahead rather than immediately below the ship is the pilot's chief concern. A rear gunner is carried in all attack planes, but he ordinarily takes no active part in ground strafing operation, his main duty being but to protect the ship from enemy aircraft to the rear.

The attack plane mounts four machine-guns firing forward and one flexibly mounted gun to the rear in addition to 10 or more light fragmentation bombs. The attack plane is not only a daytime plane but can also be effectively used at night. In this instance parachute flares are dropped from an altitude of perhaps 1,000 feet and in the light of these "mobile searchlights" the attack planes swoop low over the ground to complete their mission.

The Army's first specialized attack planes were both of the armored type and both were built by the Boeing Aircraft Company of Seattle. The first, the model GA-X, was a triplane mounting two Liberty 12As as pushers and having a top speed of 105 miles per hour. It is interesting at this point to note portions of the test pilot's report after having flown this ship for the first time. His impressions of the ship were as follows: "This ship (the GA-X) has several characteristics which seem to make it unsuitable for the work it has to perform. General criticisms of this airplane include the fact that it has pusher engines which are peculiarly liable to damage the propellers by reason of small parts and loose objects of all description blowing back into them. . . . The noise in the cockpit is terrific and a passenger is deaf for a day after a 20 minute ride in the ship. This seems to be caused by the wood fuselage acting as a sounding board with the metal shell of the pilot's cockpit. . . . To epito-

Douglas XA-2 with six forward firing guns and a 410 hp. inverted air-cooled Liberty engine. (Off. Photo U.S. Army)

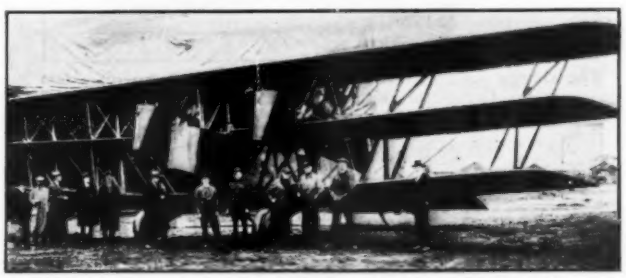
Curtiss Falcon A-3, and observation ship redesigned for attack service; 435 hp. Curtiss D-12 engine. (Off. Photo U.S. Army)

The Curtiss XA-8 attack plane; one of the first of the modern attack ships

mize the chief objections to this airplane as a ground attack machine; it is quite unmaneuverable; it has practically no visibility; the vibration and noise are excessive and annoying and it has a low speed and limited range. . . . It is believed that the airplane will not return to its aerodrome if sent over an active front, as it would be a remarkably easy target from the ground of all calibre guns up to three inches. . . ." These to-the-point observations on the armored attack were made in 1920 by the way.

Although this first armored ship was a rather dismal failure the Army tried one more type, the GA-2, another Boeing product, but in this instance a biplane with only one engine. This ship was one of the first Army ships to mount a 37 mm. cannon as well, having this weapon shooting forward and downward between the landing gear. This ship, strangely enough, was designed for an engine that did not exist at the time, the Engineering Division "W-18" 800 horsepower model. In actual practice it proved to be unsuitable for service use and at the same time the Army decided that armored attack planes had a very dubious value anyway. At this point armor plating and its difficulties were finally discarded for more practical methods of protecting material and personnel in aircraft.

So it was that the "Flying Tank" passed out of existence and the modern attack plane was born. In 1925-26 the first of these new attacks was built, all previous unarmored types being merely modified observation ships doing the dual duty of ground strafing. The Curtiss "Falcon," because of its exceptional maneuverability and performance, was selected for modification into an attack type, and a quantity of the A-3 "Falcons" was contracted for. At the same time a modified version of the Douglas O-2 observation machine made its appearance under the name of XA-2 and boasted a total complement of 6 machine-guns firing forward. Its engine was an inverted air-cooled Liberty 12 of 410 horsepower. It was found to be inferior to the "Falcon" however and was not built for service use. In fact an additional order was given the Curtiss people for 78 of the improved A-3B attacks at this time. Top speed of this ship was 141 miles per hour and ceiling was 17,300 feet. A Curtiss "D-12" V-1150 engine of 435 horsepower was used.



The massive Boeing GA-X triplane attack ship powered with two 400 hp. pusher Liberty engines. (Boeing photo)

It might be well to add that the A-1 was not made as an attack ship, the only plane bearing this designation being the old Cox-Klemin XA-1 Ambulance, made before the present attack development series.

In 1927 various modifications of the A-3 appeared, all basically the same airplane but having various types of engines and accessories. The XA-4, the most famous of these, used a 400 horsepower P & W Wasp engine, and had a slightly lower speed than the regular A-3, top being 138. The A-5 and A-6 were still further attempts by the Army to find a better power plant for the "Falcon" but much like their similar experiments with observation "Falcons," the original power plant in most cases proved to be superior.

Soon after the advent of the various engine experiments in the "Falcons" the Army decided that to be effective the new crop of attack planes should be much faster than types then in use. Forward visibility was also stressed in these new contracts so that it was no surprise to see the low-wing airplane come into this branch of the Air Corps.

The first of the low-wing jobs to appear under the attack banner was the Fokker XA-7 all-metal Conqueror-powered monoplane. The XA-7 should also be remembered as the first monocoque metal attack plane and one of the first military planes to use stressed skin wing and tail construction. The geared Conqueror V-1570-C engine gave the XA-7 a top speed of 168 miles per hour, which was far ahead of any plane of this type at the time.

Fast as the Fokker Company's ship was Curtiss went one better in producing the first "Shrike" XA-8 monoplane. Although using the same engine as the Fokker and being of much the same size its top speed was 196 miles per hour. Its wire braced wings were of typical "racing" airfoil and were completely of metal construction. Handley Page slots and flaps brought the landing speed down to the desired low level and at the same time permitted fast, steep takeoffs. An order was given for 13 of the YIA-8 type and at present these ships are still in use in an attack group in the south. One version of the "Shrike" also ap-

The Curtiss XA-4 experimental Falcon attack plane. It was powered with a 400 Wasp engine. (Williams)

The Fokker XA-7. This was the first monoplane attack ship as well as the first one of all-metal construction. 600 hp. Conqueror. (Off. Photo U.S. Army)

Latest Curtiss XA-14 with two 825 hp. Twin Whirlwind engines

The modern Northrop A-17 with perforated flaps. (Thorell)

peared with a geared Conqueror engine.

The now defunct Detroit Aircraft Company produced the next in line, the XA-9 attack. In general appearance it was somewhat like the Fokker but used a fully retractable landing gear, covered cockpits and other refinements. Its Conqueror V-1570-C engine gave it a top speed of 214 miles per hour, but it was said to have serious structural faults that precluded its acceptance as a service type.

Curtiss produced two further developments of the popular "Shrike," the YA-10 and the A-12. The first was in all respects like the earlier A-8 but used an air-cooled P & W Hornet in place of the liquid-cooled Conqueror. The A-12 differed from its forerunner in having a larger engine, the 670 Cyclone, and also being much cleaned up in general design. Forty-six of the A-12s were built and are now in use. They have a top speed of 202 miles an hour and carry 5 machine-guns and 10 30-pound bombs in internal racks as well as two 100-pound bombs in external carriers.

Consolidated entered attack competition with the A-11, a development of their successful P-30 two-place pursuit. This low-wing all-metal craft has a top speed of 227 miles per hour with full load of 6 machine-guns, ten 30-pound bombs under wings, and ten 30-pound bombs in the fuselage. It can also carry smoke screen equipment and flares. Ceiling is rather high for an attack type, being 25,000 feet. Its Curtiss-geared Conqueror engine develops 675 horsepower. Four of these ships were contracted for by the Air Corps and are now in service use.

Following up the Army's practice of using low-wing monoplanes for attack use the Northrop Corporation made the XA-13 attack. This all-metal two-seater was of usual Northrop type, having a monocoque fuselage and multi-spar all-metal wings. The wings housed 4 machine-guns and a fully covered cockpit was provided for pilot and gunner. A Wright Cyclone engine of 670 horsepower gave this job a top speed of 205 miles per hour, while service ceiling was rated at 21,000 feet. It first appeared in 1933 and although not ordered in quantity proved to have many excellent features. Many of its features may be seen in the present standard attack type, the Northrop A-17, which may be regarded as a development of the A-13. It would be well to mention at this point that the XA-16 was merely a modification of the XA-13 type for use of the Twin Wasp Junior engine and differed in the main only in this respect. Fabric-covered movable tail surfaces were also featured in the XA-16 as well as a cowling with controllable cooling fins.

The Detroit Lockheed XA-9 attack plane powered with a 600 hp. Conqueror engine. (Off. Photo U.S. Army)

Consolidated A-11 with Conqueror 675 hp. engine, converted from two seat "pursuit." Four were built. (Off. Photo U.S. Army)

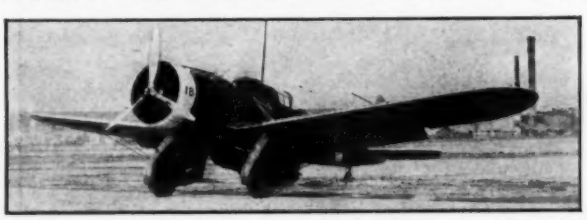
The Curtiss XA-14 is one of the newest and most interesting of all attack planes. It is the Army's first twin-engined ship of this type and is designed to fly and maintain altitude with either engine out of commission. So successful did the original XA-14 prove to be that an order in the amount of $1,259,235 was placed for a service test group of the improved YIA-18s. These last named ships are basically the same as the XA-14 but instead of using the Twin Whirlwind engines they feature two 1,000 horsepower Cyclones. They will be of natural Alclad metal color, following the Army's recent order that all metal ships should be of Alclad and hence need no painting for protection against corrosion. These YIA-18s have an all-metal fuselage and a composite wing made up of a metal leading edge and fabric-covered rear portions. The wing is of the single spar type, incidentally, and serves as a buoyancy chamber in case of a water landing.

No information relative to the Martin XA-15 has been released at time of writing.

Attack aviation has now become a very important branch of our Army Air Corps and with the present program for twin-engined ships on hand it is felt that we will have an attack force second to none. These new Curtiss ships have been rated as "the fastest twin engined military planes in the world" and it is likely that they are so, having a wing span of under 60 feet and using two 1,000 horsepower engines. Although a crew of only two is carried in these ships they will probably carry a large bomb load in addition to their machine-guns and they should probably be classed as light-bomber-attack planes in reality.

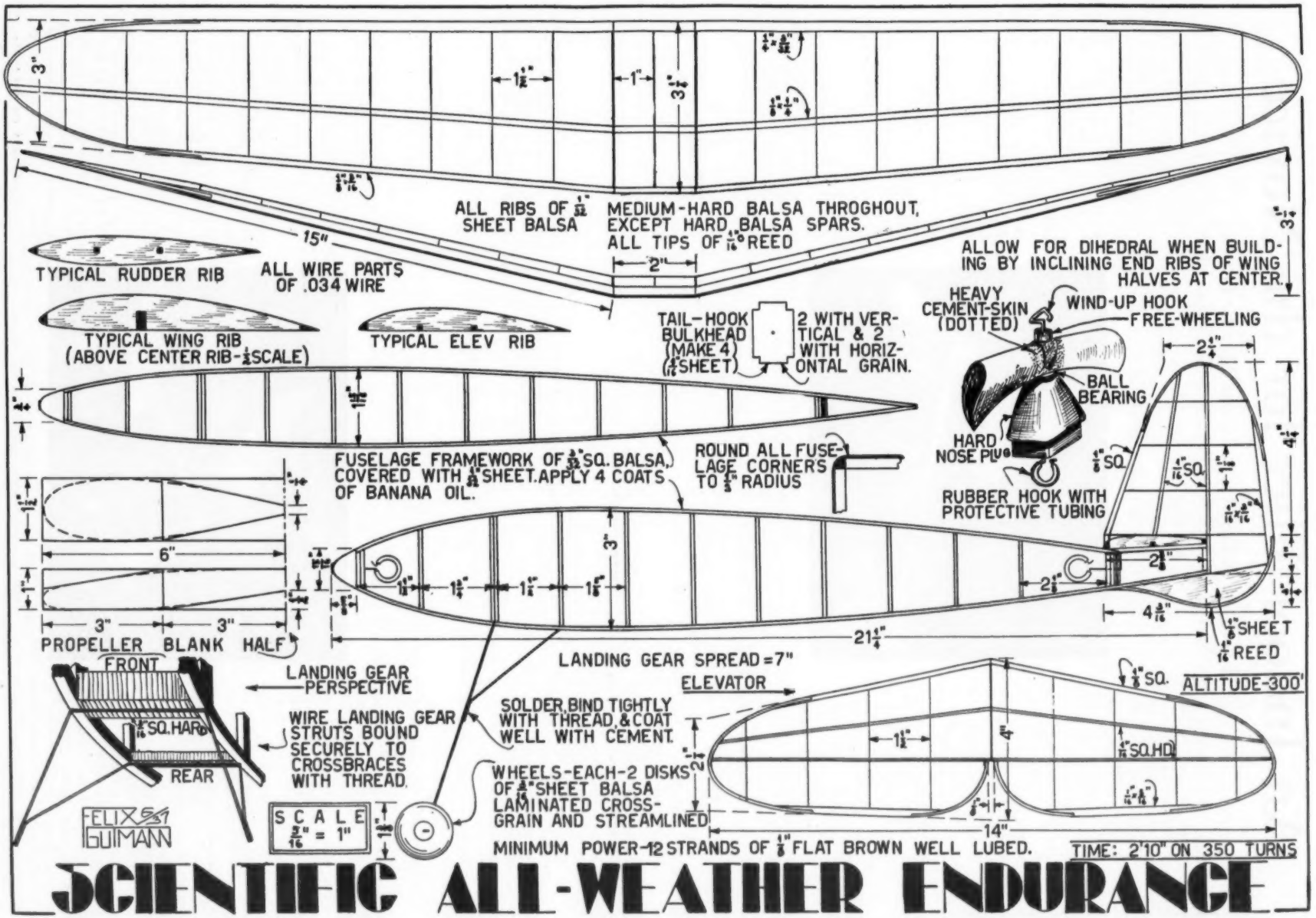
The very latest addition to the attack squadrons of the U. S. Army is the Bell twin engine attack-pursuit ship. This is one of the most formidable war planes ever built. Its speed is well over 300 miles per hour, powered with two Curtiss Conqueror engines driving pusher propellers. This type of drive enables the gunners in the forward part of each engine nacelle to have a clear view ahead of them. Two large calibre guns fire forward from each nacelle while four other guns are located at various other points on the ship.

The value of the attack plane may be estimated by the havoc it is causing in Spain and China.



The Curtiss A-12 "Shrike" with a 670 hp. Cyclone engine. The most successful of its type. (Williams)

The first "air-cooled" "Shrike" YA-10, a converted A-8 type with a 600 hp. "Hornet." (Off. Photo U.S. Army)


ALL RIBS OF 1/32" SHEET BALSA
MEDIUM-HARD BALSA THROGHOUT, EXCEPT HARD BALSA SPARS.
ALL TIPS OF 1/16" REED
15"
2"
TYPICAL RUDDER RIB
ALL WIRE PARTS OF .034 WIRE
TYPICAL WING RIB (ABOVE CENTER RIB-1/4 SCALE)
TYPICAL ELEV RIB
TAIL-HOOK BULKHEAD (MAKE 4) (1/16" SHEET)
2 WITH VERTICAL & 2 WITH HORIZONTAL GRAIN.
ALLOW FOR DIHEDRAL WHEN BUILDING BY INCLINING END RIBS OF WING HALVES AT CENTER.
HEAVY CEMENT-SKIN (DOTTED)
WIND-UP HOOK
FREE-WHEELING
BALL BEARING
HARD NOSE PLUG
RUBBER HOOK WITH PROTECTIVE TUBING
FUSELAGE FRAMEWORK OF 1/32" SQ. BALSA, COVERED WITH 1/32" SHEET. APPLY 4 COATS OF BANANA OIL.
ROUND ALL FUSELAGE CORNERS TO 1/8" RADIUS
6"
3"
3"
PROPELLER BLANK HALF
21 1/4"
1/8" SQ.
1/16" SQ.
1/16" SHEET
1/16" REED
FRONT
REAR
1/16" SQ. HARD
LANDING GEAR PERSPECTIVE
WIRE LANDING GEAR STRUTS BOUND SECURELY TO CROSSBRACES WITH THREAD.
SOLDER, BIND TIGHTLY WITH THREAD, & COAT WELL WITH CEMENT.
WHEELS-EACH-2 DISKS OF 1/16" SHEET BALSA LAMINATED CROSS-GRAIN AND STREAMLINED
LANDING GEAR SPREAD = 7"
ELEVATOR
1/16" SQ. HD.
14"
SCALE 3/16" = 1"
FELIX GUTMANN
ALTITUDE-300'
MINIMUM POWER-12 STRANDS OF 1/8" FLAT BROWN WELL LUBED.
TIME: 2'10" ON 350 TURNS

SCIENTIFIC ALL-WEATHER ENDURANCE

An Indoor Flier for the Novice

This Plane Is Easy to Build and May Be Flown in the House. An Excellent Practice Model for Future Indoor Fliers

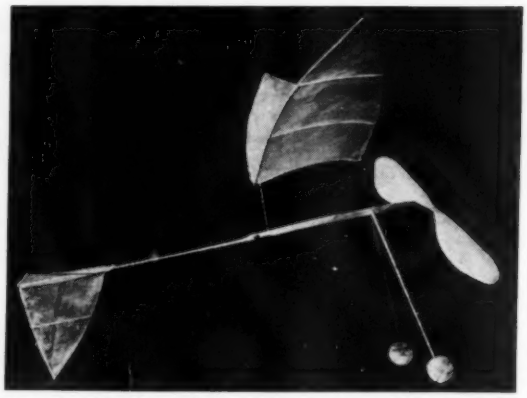
By WILLIAM HADDEN

FOR those who would like a temporary let up from the neck-breaking and sometimes heart-breaking chasing of outdoor flying, this indoor model is offered as a good substitute. It does not require an auditorium to fly in. Its size permits ample opportunity for hours of fun in an ordinary dining room.

The construction of the model is simplified in many respects. The propeller is not carved but is bent from sheet balsa. The motor stick is not hollow but is made of light indoor balsa. These qualities serve to cut down the time and labor in constructing the model. Two hours being the average time in which to turn it out.

Those who have not become very proficient at indoor flying and who are eager to be so are advised to build several models of this type before attempting the large microfilm jobs. By doing so they can become accustomed to the delicate construction and adjustments required.

The plans are given in full size. This simplifies the construction. Indoor balsa must be used throughout in order to have the best results.



The completed model covered with "tissue" is light enough to give long flights in a small space

List of Material Needed

One sheet of 1/32" sheet balsa for wing, tail and rudder spars, prop blank and landing gear.

One sheet of superfine tissue.

Motor stick—1/16" sheet balsa.

10 inches of 3/64" brown rubber.

A length of .012 piano wire for hooks.

One strip of 1/32" sq. bamboo for wing struts.

Small duralumin thrust bearing and two indoor washers.

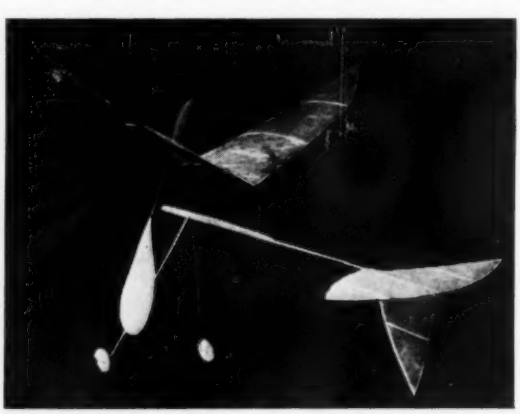
Motor Stick and Landing Gear

The motor stick is made of 1/16" sheet balsa and cut to shape as shown on the plan. This apparently weak stick will stand up perfectly well with 3/64" rubber which is enough to power the model. A small duralumin thrust bearing is glued to the front and a small hook is glued to the point shown on the plan. All gluing should be done sparingly and with care to keep the weight down.

The landing gear struts are cut out of the 1/32" sheet balsa with a straight metal edged ruler. These struts taper from 1/32"x1/16" at the top to 1/32" sq. at the bottom. The wheels are cut out of 1/32" sheet balsa and sanded to 1/64" thickness. Eyelets for the wheels are of paper tubing. Two small strips of thin tissue paper are wrapped once or twice around a piece of wire or a pin to make them tubular. A coat of banana oil will harden them to that shape. When dry they are pushed through the center of each wheel and glued there. Axles for the wheels are made of bamboo. Two thin slivers 3/8" long are suitable. A small drop of glue is put on the axles to keep the wheels from falling off. The wheels when resting on the ground should be about 3" apart.

Wing

The wing is very simply made. Four strips 6½" long are cut from 1/32" sheet balsa with your metal edged ruler. These are cut so that they taper from 1/16"-x1/32" to 1/32" sq. at the ends. With a little care they can be cut evenly and to equal size. These are laid on the plans and held to shape with pins. The ribs should be cut from quarter-grained stock in order to have the maximum stiffness. If this is not obtainable any 1/32" sheet balsa will serve the purpose. Make a template of the rib shape from cardboard. Place it on the sheet balsa and cut along the edge. Move the template down 1/32" and cut again. This is repeated until the six ribs are cut. The front of each rib is glued to the leading edge of the wing. When they are dry they are glued to the trailing edge by cutting away the excess length. When the wing is dry it is not covered until the two halves are glued together with the dihedral in. Superfine tissue makes a light covering and is applied the same way as any tissue using banana oil or thin dope as an adhesive. The grain of the tissue should run chordwise and not lengthwise to get the best covering since the paper is not sprayed. The wing is mounted high on two struts of 1/32" sq. bamboo for stability. Notice that it is offset about ¼" to the side shown on the plans. To save the trouble of making clips, the bamboo struts are glued directly to the stick. As the wing can't be moved back and forth, adjustments for flying the model are made entirely on the tail surfaces.



Though it has the characteristics of an indoor contest plane, the construction operations are simple

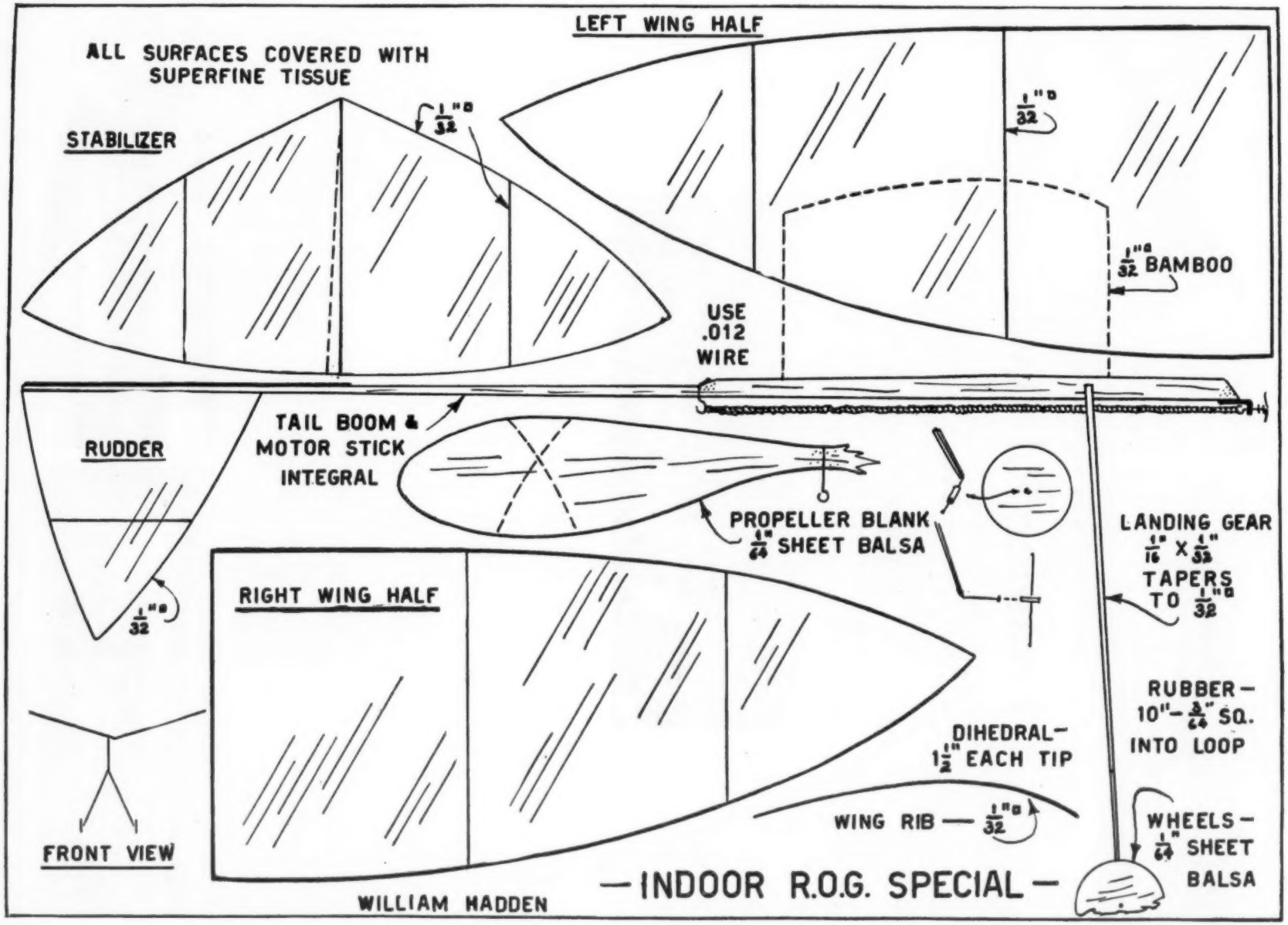
Tail Surfaces

These are made like the wing except that they are not cambered but flat. Cut 1/32" sq. strips for the outlines and hold them in place on the plans with pins. The cross-pieces are also 1/32" sq. They are covered with tissue before gluing to the motor stick. You will notice that the rudder is offset making the model circle to the left. Also notice that the rudder is glued to the underside of the stabilizer. To some extent this helps the model to be more stable.

Propeller

Since the performance of the model depends largely on the propeller a great deal of care should be used in making it. However, to eliminate most of the trouble, we have incorporated a prop which is bent from sheet balsa. This is not a new feature but it serves the purpose admirably. In addition, the bent balsa prop if treated properly, will outlast the life of the model. For this purpose 1/32" sheet balsa of a stock which is cut so that it bends easily without splitting is the most desirable. If you are entering a contest and are after records, an inch bigger prop will help increase the duration. If not, it is cut to the size and shape shown and rounded off. With a very fine grade of sandpaper the blank is sanded so that it tapers from 1/32" at the hub to 1/64" at the tips. Take care to have the blades balance. The blank is now soaked in hot water to make it more pliable. Next secure a piece of flat card-

(Continued on page 53)


LEFT WING HALF
ALL SURFACES COVERED WITH SUPERFINE TISSUE
STABILIZER
1/32" D
1/32" D
1/32" BAMBOO
USE .012 WIRE
RUDDER
TAIL BOOM & MOTOR STICK INTEGRAL
PROPELLER BLANK 1/64" SHEET BALSA
LANDING GEAR 1/16" X 1/32" TAPERS TO 1/32" D
1/32" D
RIGHT WING HALF
RUBBER — 10" — 3/64" SQ. INTO LOOP
DIHEDRAL — 1 1/2" EACH TIP
WING RIB — 1/32" D
WHEELS — 1/64" SHEET BALSA
FRONT VIEW
— INDOOR R.O.G. SPECIAL —
WILLIAM HADDEN

The Wittman D-12 special, the fastest plane at the races in spite of its box-like design (Morrison)

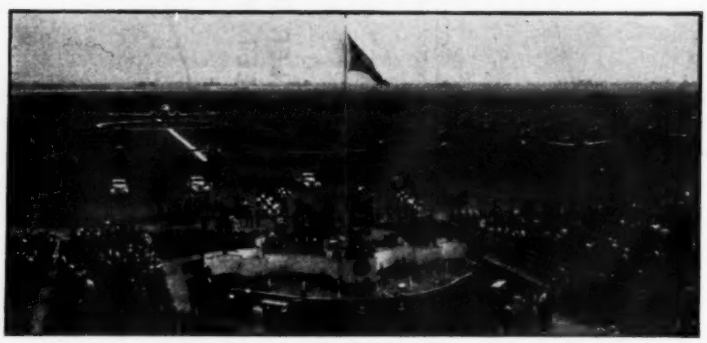
Frontiers of Aviation

Highlights of the 1937 National Air Races Held at Cleveland—How to Build a Scale Model of the 1937 Crosby Racer

By ROBERT C. MORRISON

IT IS safe to say that the Cleveland Airport is the finest in the country. Recent costly improvements have made it equal or better than the great airports abroad, and for that reason no better place could be selected for the world's greatest show, the National Air Races. One side of the field is used by the airlines and private fliers and the other side, large enough to permit a whole squadron of planes to take off at one time, is used for the Races.

The Races were held on September 3-6, and on the day preceding some of the speed trials were held for the participating racing ships. The only fatality occurred at this time, which was a sad beginning for the National Air Races. Coming down the straightaway course across the field Lee Miles had his speedy Miles-Atwood Special full out. As he began to whip his ship around the pylon at the end of the course one of the flying wires on the wing snapped, and both wing panels gave way at almost the same time. The fuselage spun around as the engine kept running for some time and then the wreckage dove into the trees. Lee was undoubtedly killed before he hit the ground, and thus America lost one of its greatest racing pilots.



The opening ceremony at the Cleveland Air Races, 1937. (Morrison)

In the next four days one saw the usual humdrum of events, mass formation flights by the Army, Navy and Marines, parachute jumps totaling over two hundred, stunting by such pilots as Rankin, Wittenbeck, Papana, Hagenburg and Granere, and of course the many closed course races. One of the completely new events this year was Mike Murphy's take-offs and landings on a small platform mounted on top of a car. He used a Taylor Cub.

A new Army stunt trio performed this year, and they were as good as any team I have yet seen. Waldo Waterman had two of his Arrowbiles on hand to demonstrate their practicability of maneuvering on land as well as in the air. Waco demonstrated their new ship with a wheel in the nose and the new Gwinn Aircar also made its first public appearance under the piloting of Comm. Frank Hawks. (We first brought this ship to your attention over a year ago.)

Nine huge Boeing four-engined bombers made speed dashes across the front of the stands on one day of the show, which was certainly an interesting spectacle. In contrast were Harold Johnson's loops and barrel rolls in a big tri-motored Ford.

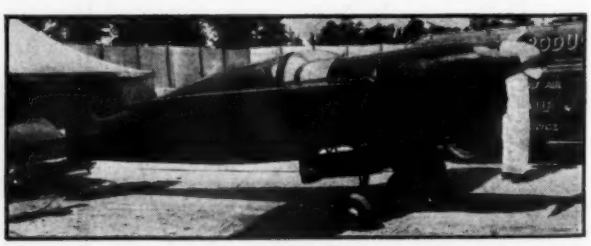
Charles Abel stunted a biplane glider as he had done at former National Air Races. The show in its entirety was well worth watching for the four full days, and those who missed the National Air Races this year should make it a point to attend next year, for a still bigger and better show is promised then.

But now let us get down to the racing ships. There were very many of them this year. They were as follows: Laird-Turner racer, Turner's Wedell-Williams, three Seversky racers, Sundorph Special, Ortman's Kieth-Rider, Schoenfeldt's Kieth Rider, Haines Special, Delgado Special, Chester's "Jeep," Miss Los Angeles, Roger Don Rae's Folkerts, Kling's Folkerts, Loose Special, Wittenbeck Special, Wittman's Menasco and Curtiss D-12 racers, and Jack Wright's Wedell-Williams 92 was present without its tail after cracking up in a landing.

Roscoe Turner's job was a fine-looking airplane and a very large one. It appeared to have one of those new 14 cylinder Pratt & Whitney Twin-Row Wasps in its nose. A full N.A.C.A. cowl covered the engine and tapered slightly as it met the fuselage. The wing is full cantilever and of mid-wing design and is so very thin that the plane must have a phenomenally fast speed when the engine is pumping out all its

(Continued on page 48)

Rudy King's Folkerts with a 250 hp. Menasco Super-Buccaneer engine, which won the Thompson Trophy. (Morrison)

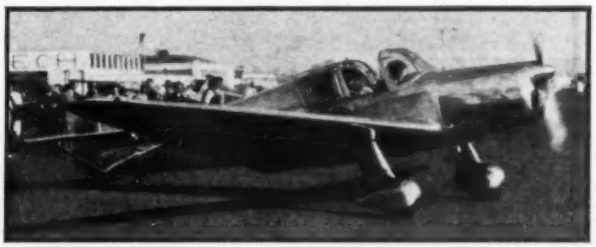


Roger Don Rae's Folkerts with a four cylinder Menasco engine, one of the fastest in its class. (Morrison)

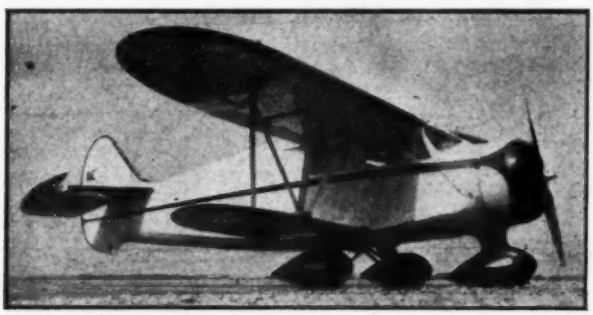
The Seversky Racer, winner of the Bendix Trophy Race, powered by a Twin Wasp of 1925 hp. (Levy)

Roscoe Turner's 1200 hp. special racer that placed third in the Thompson Race, after rounding one pylon twice by mistake (Morrison)

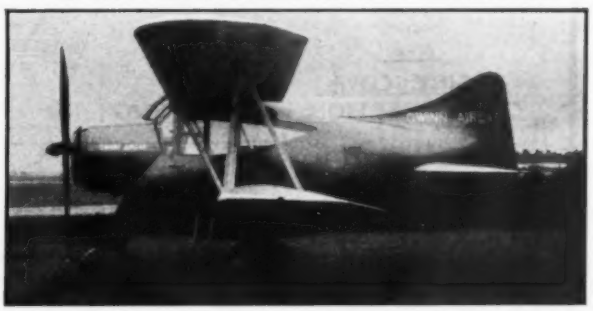
The Wittenbeck Special, lowest powered participating racer



New Ryan cabin sport plane designed for mass production



The latest Waco with a three wheel landing gear. (Morrison)



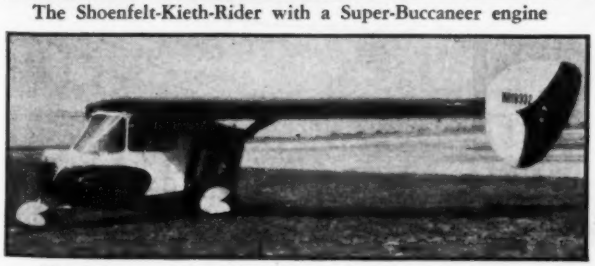
The Winn Aircar with Popjoy engine; flown by Frank Hawks

The Curtiss YIP-36 Pursuit ship (seen at the races)

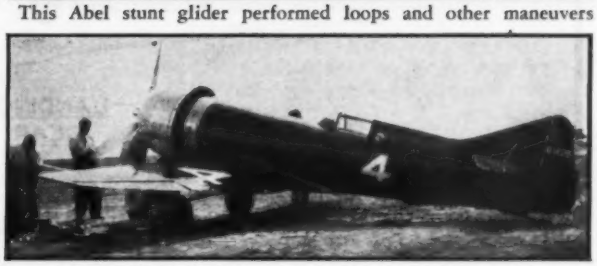
The Delgado Flash, the only all-plywood racer

The Shoenfelt-Kieth-Rider with a Super-Buccaneer engine

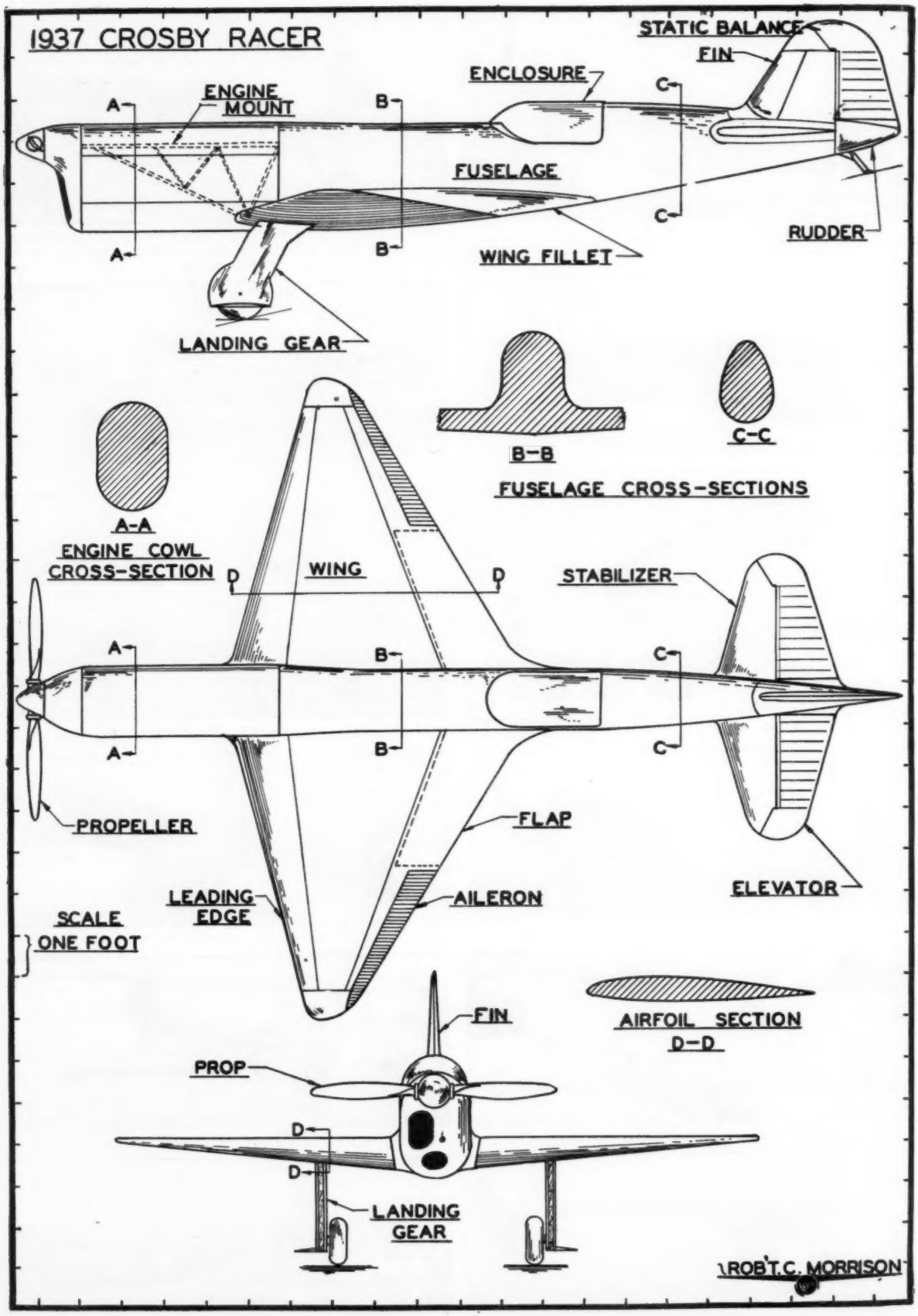
This Abel stunt glider performed loops and other maneuvers



The Waterman Arrowbile. It may be driven as a car



Ortman's Kieth-Rider, 2nd in Bendix and Thompson


1937 CROSBY RACER
STATIC BALANCE
FIN
ENCLOSURE
ENGINE MOUNT
A
B
C
FUSELAGE
RUDDER
WING FILLET
LANDING GEAR
B-B
C-C
FUSELAGE CROSS-SECTIONS
A-A
ENGINE COWL CROSS-SECTION
D
WING
STABILIZER
PROPELLER
FLAP
LEADING EDGE
AILERON
ELEVATOR
SCALE ONE FOOT
FIN
AIRFOIL SECTION D-D
PROP
LANDING GEAR
ROB'T.C. MORRISON

Your Career In Aviation

A Practical Discussion of the Basic Problems on Choosing a Career in the Engineering Phases of Aviation

By WILLIS NYE

Getting information on his future career. The young son of Mr. and Mrs. Ralph P. Coates, of Lowell, Mass., shows keen initiative in getting the "dope" on aviation matters at the age of 2½ years

THE professional goal of the youthful model designer is the aviation industry. Opportunities are offered to the young man which if properly exploited will allow a reasonable financial return. The formula for success in any endeavor is an earnest application combined with technical training so that whatever opportunity is presented to the apprentice by forces beyond our immediate control may be grasped and personal benefit gained. "Big jobs" and "big money" do not exist in the true sense of the word. The industry is stabilized and the economic conditions which affect all industry today apply in this profession as well.

Training and experience determine whether the individual will ultimately be a success. By ultimately, it is meant middle life which after all as a part of living has to be seriously thought about. After middle life is attained, jobs are few and far between. The economic forces existing in the industrial world tend to eliminate the employment of an elderly person in the lower salary bracket of jobs. It is essential that the apprentice embarking upon an engineering career become professionally stabilized as reasonably quick as possible. Only in this manner can a sound and secure future be assured by the time middle age has arrived. If the apprentice years have been profitably spent, then the benefit derived from past experience will permit the elderly person to attain an executive capacity with an income commensurate with the position.

Engineering is essentially a job for the young man. It is no sinecure by any manner or means. A combination of theoretical and technical training coupled with practical experience, determines to a large degree the chances for advancement into the higher bracket executive positions. The theory is easy to absorb and to learn. The difficult part is to acquire a well rounded practical experience. Practical experience entails hard work, an aptitude to do tedious and precise tasks, and the characteristic of meeting whatever adversity may chance to come one's way. To be successful, it is also necessary to know the meaning of adversity not only in a financial way, but in a technical way. Technical problems entail a persistence in endeavor and fortitude to overcome mechanical imperfection. Success is often attained through adverse conditions.

University training is necessary to assure a position in the higher salary range. Now this does not imply that the individual who lacks the advantages of college training is doomed to mediocrity because the man who is often the greatest success never had the privilege of attending an institution of higher learning. The unmitigated fact remains, however, that theoretical training is not all, and that theory without practical experience and a knowledge of how to apply theory, work hand in hand. For instance, the average student engineer has very little conception of servicing problems entailed in modern airline operation. The logical way to gain this knowledge is by partaking in this line of work for a limited duration.

Practical experience is attained by serving an apprenticeship in the factory gaining a conception of fabrication technique, the repair depot, the trade school, or else as a general student mechanic. This experience pays big dividends in later years. Without this practical experience it would be difficult to design an airplane that would meet the servicing requirements of today. It should be part of every engineer's education to serve as an apprentice helper and do the actual work in some phase of airline routine. For instance, when wheel fairings were first employed, it was well nigh impossible to change a tire without ruining the delicate fairing. Service experience in these lines has corrected this fault. The writer once worked on an airplane on which it was well nigh impossible to replace the magneto without unhooking the whole engine mounting. This consumed four hours time and extensive tools when it should not have entailed more than one half hour's time at the most. The engineer who designed that machine forgot that magnetos have to be serviced. One of our modern V engines has to have the induction and carburetor manifold disconnected to permit the inside plugs to be cleaned. This should ordinarily be a simple task. Another of our in-line engines has to have the exhaust manifold disconnected from all cylinders in order to remove one cylinder. Such examples as these emphasize the need for practical experience as a basis for future design.

A general knowledge of the fundamentals of mechanical engineering is the basic prerequisite for aeronautical design practice. The theory of structures, joints, strength of materials, disposition of materials, redundency, the theory of least work, analysis of beams and trusses, graphic statics, applied mechanics and the polar analysis of structures, comprise the main technical background. When mechanical engineering is mastered then the theory of aerodynamics unfolds easily to the student engineer. Obviously a fluent knowledge of mathematics forms the background for all of these investigations. Furthermore, a study of current specifications, the material covered in typical specifications and the method of preparation should receive extended attention.

The very fact that many modern aircraft lack certain phases of good engineering technique points out the truth that there is a vast field of improvement possible. Now without the practical knowledge of how to apply technical training will avail the student engineer nothing. Herein lies the ability of the engineer in combining the two sides of every design problem.

Economics plays an important role in airplane construction and design. Until comparatively recent years, the whole economic aspect of airplane construction and operation has been sadly neglected in the mere contentment that an airplane could fly. It has been imperative that airlines and factories show substantial profits because the securities of these concerns are held by the public at large who demand justifiable returns on their investment. A sound knowledge of economics is as essential as technical theory to the progressive engineer. A knowledge of materials and procurement is as important as fabrication technique because without the former the latter is impossible. Furthermore, airlines issue specifications concerning the procurement of new equipment and invariably certain performances must be achieved at the minimum of operation cost.

The trend in modern aircraft construction is toward the use of a stressed skin all-metal structure. Now this particular application of engineering involves the strength characteristics of the thin plate and the disposition of stiffeners. The general available knowledge on the whole subject is limited at the present time and there is much pioneering work to be undertaken. A sound knowledge of applied mechanics is the only logical solution for advanced studies of this nature.

Peculiar as it may seem, very few engineers are capable of drawing neatly and attractively. There is a decided lack of draughtsmanship, character, style, good lettering, and methods of clear exposition on paper. After all, if ideas cannot be suitably presented and conveyed to others on paper, then the intrinsic value of the

(Continued on page 47)

National Aeronautic Association Junior Membership News

Prepared by National Aeronautic Association, Dupont Circle, Washington, D. C.

WHEN things begin to happen quickly, someone is bound to be disappointed. Model meets have been scheduled one after another recently and one record after another has been broken. National headquarters received an application from Frank W. Elmiger, Contest Director for the Jersey Mosquitoes, for a Junior record made by Donald Bidgood with a Class B hand-launched glider, at the Jersey Mosquitoes Meet held on August eighth. His time was 48 seconds. And now comes the sad news. Just the day before, August seventh, the Boston group had a meet and this record was broken by Martin Phillips of Boston with a time of 1m 42.8 seconds. Congratulations to Martin Phillips but we know just how you feel, Donald. You have what it takes, so keep trying.

Something To Worry About In New Jersey Beside Gas Models

Gill Robb Wilson, State Commissioner of Aviation, Says:

"I am surprised at a lot of these big game hunters. What a rare thing a sense of humor is. The models don't bother us much here in Jersey, where we only have the most crowded airways in the world, and other things to think about.

We do, however, have a serious problem with the seagulls. Aldworth has refused to allow them to land on Newark Airport any more without two way radio, and the gulls say the static is unendurable around Newark and have all gone to Floyd Bennett.

In south Jersey, notably at Atlantic City, we allow no gulls on the airways under 7,000 feet, and just recently we have found it necessary to require the mosquitoes to carry running lights and fly at even higher altitudes, submitting flight plans when they intend to land north of a line running south, seventy-five miles wide and one-hundred feet on the corners."

We think they should term Kansas the "windy state." Those poor fellows out there try and try again but the elements seem to be against them. As reported in these pages of the last issue, they had a meet scheduled for the fifteenth of August. As usual, when they were all set to break at least half the records, that famous Kansas "high wind" proceeded to make a nuisance of itself. But being the persevering people that they are, they went ahead with their meet. Dr. Hugh Wilson, Topeka, H. O. Gladfelter, Emporia, and Charles Pratt, Pratt, were the judges and there were nearly one hundred planes entered. Here are the first prize winners in the major contests: Bill Downey, Wichita, with his Model Cessna, won the Berryloid Trophy for the best finished ship; Jack Chastain, Wichita, won the Cessna Trophy and a leg on the Skelly Trophy in the Wakefield Event; Jimmy Walker, Emporia, walked away with the gas-model meet, with the Swallow Trophy and the large TWA Trophy. It takes three wins to retain the TWA Trophy. Eldred Jones won the Downey Trophy for the unrestricted open model contest; Paul Garner, Wichita, won first place in the Senior Class C Fuselage event and took the Beech Trophy; Eugene Linn, Wichita, Class C Stick winner, received a gas model plane and Russell Culp, Kansas City, in the Junior Class C Fuselage Contest won the Stearman Trophy.

The gas jobs in their contest got a big hand, in spite of that high wind and a 100-degree temperature. They're proud of their boys out Kansas way and we don't blame them a bit.

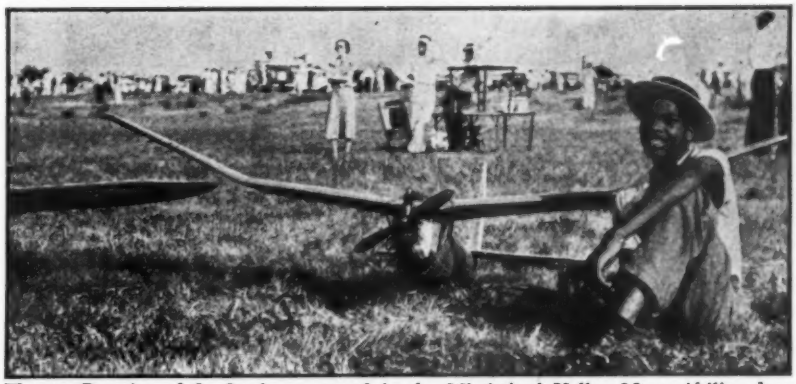
A high wind in Rockford, Illinois, carried away several of their models, too. According to our records many cities in Wisconsin and Illinois were represented. The highlight of this competition was the gasoline-powered event in which the five leaders recorded flights of more than six minutes and most of the entries were carried five miles or more from the starting point. Altogether there were about 150 entries and several thousand spectators. Everyone is reported to have had a fine time, and that is one purpose of these meets.

On August seventh and August twenty-fifth at two Chapter meets, those

A contestant adjusting the motor in the fuselage of his plane just before a flight. (Miss. Valley Meet)

A typical scene at the big contest. "Weighing in" at Mississippi Valley Meet

Chicago record-breakers, again showed what they were made of by setting a Helicopter and Ornithopter record. Richard Obarski, 1733 East 86th Street, Chicago, made a flight of 4 minutes and 35 seconds with his Helicopter and Leonard Elgenson, 1108 Glenlake Avenue, Chicago, took honors with his Ornithopter with a time of 6 seconds. If you don't believe that these "record-breakers" as we call them, are entitled to the name, just take a look at the records they have set up and the places they take in meets out of town.



Thomas Brantley of St. Louis, competed in the Mississippi Valley Meet. Ability does not confine itself to any one race

The lucky winner of the Cincinnati Meet, held August twenty-ninth at the Hugh Watson Airport, got a trip to the Cleveland National Air Races. He is S. F. Bus, Jr., 3552 Paxton Road, Hyde Park, Cincinnati. His model was a Miss America, powered by a Brown Junior Motor. It weighed 5 pounds and 3 ounces and his total time was 11 minutes and 3 seconds. Nice going there, fella! This meet drew a crowd of between eight and nine thousand spectators. Murray Taylor and Major Hugh Watson were judges and Julius Meyer, the Contest Director.

The Decatur, Illinois, (Senior) Chapter started out to have a meet which was to be a local recreation project but the model boys in Illinois soon got wind of it and entries came pouring in. Dr. G. E. Folkman, however, went ahead with his plans except that they were on a much larger scale. Fifty-one planes took to the air before a crowd of several thousand spectators. The Mattoon Aero Club walked away with the meet, taking first place in each of the four divisions of competition. The winners in each division were: James M. Estell, The Flying Scale Model class; Paul Corn, the Gas Model Class; John Preston, the Fuselage Class; Justin Authaus, the Stick Model Class.

Doctor Folkman deserves a great deal of credit for his fine work with his meet. He has just recently been appointed as a Contest Director and has gone into this model activity with a will.

Though their Charter was issued not so very long ago, the New Iberia Chapter of the N.A.A. together with the Lafayette, La. (Senior) Chapter sponsored a Statewide meet which was quite a success. There is a lively little fellow down there who knows plenty about this model work and has certainly done more than his part in interesting all of the state. We're talking about Rocco S. Glorioso. This whole meet was run under his direction and we have word that he did a swell job. In fact, everyone enjoyed it so much that it was decided to make it an annual affair. Many beautiful prizes were offered and as a crowning touch, Mayor Maxine Roy of Lafayette gave a banquet. Those winning first place in each of the events are as follows: A. W. Powell, Gas Model Event, won the Evangeline and Gov. Leche Trophies; Robert Basnett, Flying Scale Event, won the Daigre Trophy; Edward Gossen, Endurance Cabin Event, won the Fraim Trophy; Robert Basnett, Exhibition Scale Event, won the Wedell Williams Trophy.

Jerry Kolb, of Cleveland, who set a new world's record for stick models at the Scripps-Howard meet Aug. 30th-Sept. 2nd, Cleveland, O.

Another boy was disappointed too. The Jacksonville, Fla., Model Club held a meet on September fifth. In all good faith, W. L. Timpone, the Contest Director, sent in an application for a record made by Horace Smith. However, it seems that just a few days before, one of the boys at the Scripps-Howard Junior Aviator Meet had broken the same record, namely in the Junior Cabin Fuselage, R. O. G. Class. It's too bad, Horace, but much better luck next time.

And two more national records bit the dust! The New York State Fair Model Airplane Meet really did their meet up in fine style. They had 151 entries and some 600 or more spectators. A public address system was used throughout the day and all events went off on schedule as a result. From 5:30 to 6 p.m. the Meet was broadcast through Radio Station W. F. B. L. direct from the airport and the winners of the events were interviewed by the station announcer. The awarding of prizes was also broadcast.

Since this meet took place at a fair, it was nothing but right that the models, in all their finery, should be displayed. We can just bet that they brought forth a lot of oh's and ah's.

Of primary interest, though, is the fact that two records were set. Wayne Fullmer, in the Senior Outdoor Class C. Fuselage R.O.G. event set a wonderful record of 41 minutes and 30.5 seconds. William Jackson, in the Junior Outdoor Class C. Stick-launched event made the fine time of 7 minutes 44.2 seconds to establish a record for that event. Both these boys bettered the former record by an amazing amount. The former record for Fuselage R.O.G., Class C, Senior, was 13 minutes and 25 seconds. The former record in the Junior Outdoor Class C, Stick-launched was 2 minutes and 57 seconds. These boys really

One of the first gas models, built by N.A.A. members of Trenton, at the International Gas Model Contest, May 22nd, 1936, Hadley Field Airport

The 44th Air Scout troop of Trenton, N.J., laying out an air marker under the supervision of E. C. Plummer, N.J. State Police

tacked up a record that it will take a lot to reach.

August first, 1937, saw many countries represented at Fairey's Aerodrome, Hayes, Middlesex, England for the Wakefield International Cup Contest. According to reports many fine flights were made, and though America did not come out on top, all of our representatives had a swell time. An undying debt of gratitude is owed to the Akron Women's Chapter of the N.A.A. for their very fine assistance in getting the American team to the Wakefield. Thanks, and thanks again from all of us.

* * *

COMMENT ON GAS MODELS
By MR. F. X. DOWNEY
Wichita, Kansas

"I have been reading, with a great deal of interest, the arguments pro and con regarding the flying of gasoline powered model airplanes.

"In my opinion it would be a great mistake to see this wholesome sport abolished. In the September issue of National Aeronautics the article by Mr. Charles H. Grant very clearly outlines the fallacy of our conscientious objectors. I must confess that there have been times when I looked with disfavor upon the flying of gasoline powered models but it was only from a standpoint of safety. To be exact I several times made objections to flying them at contests where only rubber powered models were scheduled. This was due to the fact that no provision for the safety of the spectators had been considered.

"At Wichita, Kansas, on August the fifteenth, we held a State Championship Contest. For three months previous to this date a committee representing the Wichita Aviation Club, the local chapter of the N.A.A. and the I.G.M.A. Unit was at work and details were perfected to such a degree that there was complete harmony with the airport officials and the crowd as well as the contestants. I can see no reason why such a plan cannot be worked out to the satisfaction of all concerned in other locations.

"When we wish to go out to make our

Bruce Luckett stores up energy for a flight at Miss. Valley Meet

private flights we have secured the use of space considerably out of the city and to my knowledge no flights have ever been attempted within close proximity of our city. This has been accomplished through organization of the N.A.A. and the local Unit of the I.G.M.A.A. We have carefully selected Senior Advisors and Contest Directors who have done their job well.

"Very recently I have had the pleasure of seeing the chief executives of two airplane manufacturing companies sitting down on their heels examining gasoline powered model ships and heard one of them remark that he had never experienced such a thrill as he did watching these models perform. Many a Sunday afternoon we have an audience at our flying field and these spectators seem to enjoy the flights as well as we do. They have always been quite considerate of our request that they remain a safe distance from the take off.

"I am heartily in favor of immediate regulation which would embody the licensing of all gas models and the installation of timing devices which will prevent a motor run of over a set period of time. If our instructive sport is to be harassed by unbelievers then let us act as once to prevent further inroads against it.

"In my capacity as Director of Model Airplane Activities for the N.A.A. in the State of Kansas, it has been my privilege to talk before Civic groups and organizations in several cities in our state and it has been my pleasure to point out the constructive advantages to our youth in the construction and flying of model airplanes. Good sportsmanship, education in construction, and recreational application are among the virtues which must not be overlooked. The safe future of aviation can get a good start right there.

"I recently had the pleasure of attending a class in model building which was being conducted by an officer of the Juvenile Court in a nearby city. This gentleman told me that he had accomplished much with this work in keeping his charges out of mischief. Some of the boys who had been extremely unruly are devoted to their instruction to such an extent that they now cause him very little worry. A civic organization has backed up his endeavors and supplies materials for the boys who are not in a position to purchase them.

"With the good that can be accomplished for the future of aviation, let's keep the gas models flying."

* * *

Air Scouting

Over in Trenton, New Jersey, the 44th Air Scout Troop, sanctioned by the Na-

(Continued on page 54)

The air marker at Trenton, N.J. Marine Terminal. The letters painted in outline only require less paint, yet are effective

Official National Model Aircraft Records

As of August 31st, 1937

INDOORS

STICK MODEL AIRPLANES, Hand-Launched

Class B

Junior:	John S. Stokes, Jr.	Huntington Valley, Pa.	18m 12.2s
*Senior:	Wallace Simmers	Chicago, Ill.	21m 30s
Open:	Ernest A. Walen	Springfield, Mass.	18m 46.5s

Class C

Junior:	John S. Stokes, Jr.	Huntington Valley, Pa.	20m 53s
Senior:	Robert Jacobson	Philadelphia, Pa.	25m 29s
Open:	Carl Goldberg	Chicago, Ill.	23m 29.3s

STICK MODEL AIRPLANES, R. O. G.

Class A

*Junior:	Ralph Brown	Arlington, Mass.	12m 27s
Senior:	Ervin Leshner	Philadelphia, Pa.	15m 47.4s
*Open:	Roy Wriston	Tulsa, Okla.	10m 05s

Class B

Junior:	John Stokes, Jr.	Medford, Mass.	17m 19.3s
Senior:	Hyman Oslick	Philadelphia, Pa.	17m 03.8s
Open:	Ernest A. Walen	Springfield, Mass.	17m 42.8s

STICK MODEL AIRPLANES, R. O. W.

Class A

*Junior:	W. N. Hewson	Atlantic City, N. J.	7m 25s
*Senior:	George Micott	Allentown, Pa.	8m 05.4s
*Open:	Bruno Marchi	Medford, Mass.	8m 42.2s

Class B

*Junior:	David Call	Philadelphia, Pa.	10m 41.2s
*Senior:	Walter Lees	Philadelphia, Pa.	14m 35.4s
Open:	William Latour	Philadelphia, Pa.	13m 15s

GLIDERS, Hand-Launched

Class A

*Junior:	Milton Huguelet	Chicago, Ill.	44.5s
*Senior:	Wallace Simmers	Chicago, Ill.	49.3s
*Open:	Carl Goldberg	Chicago, Ill.	45.4s

Class B

Junior:	Robert Gelbard	Chicago, Ill.	49.2s
Senior:	Wallace Simmers	Chicago, Ill.	58.4s
Open:	Carl Goldberg	Chicago, Ill.	47.5s

CABIN FUSELAGE, R. O. G.

Class B

Junior:	John S. Stokes, Jr.	Huntingdon Valley, Pa.	14m 15.3s
Senior:	Charles Heintz	Philadelphia, Pa.	13m 12.2s
*Open:	John Ginnetti	Atlantic City	17m 48.6s

Class C

Junior:	John Stokes, Jr.	Huntingdon Valley, Pa.	15m 05.6s
Senior:	John Haw	Philadelphia, Pa.	17m 14.8s
*Open:	Roy Wriston	Tulsa, Okla.	14m 44.9s

CABIN FUSELAGE, R. O. W.

Class B

Junior:	Joseph Lahuta	Camden, N. J.	4m 57.6s
Senior:	Sidney Axelrod	Chicago, Ill.	6m 32.2s
Open:	William Latour	Philadelphia, Pa.	5m 42s

AUTOGIROS, Launching Optional

No Classes for Size

Junior:	Milton Huguelet	Chicago, Ill.	1m 11s
Senior:	Richard Obarski	Chicago, Ill.	2m 26.5s
Open:	Carl Goldberg	Chicago, Ill.	54s

HELICOPTERS, Launching Optional

No Classes for Size

Junior:	Alex Nekimken	Chicago, Ill.	2m 07s
*Senior:	Richard Obarski	Chicago, Ill.	4m 35s
Open:	Carl Goldberg	Chicago, Ill.	2m 46.2s

ORNITHOPTERS, Launching Optional

No Classes for Size

Junior:	Milton Huguelet	Chicago, Ill.	1m 36.8s
*Senior:	Dennis Turner	Chicago, Ill.	4m 19.2s
Open:	Carl Goldberg	Chicago, Ill.	1m 28s

*New National indoor records established since listing of February 28, 1937.

OUTDOORS

STICK MODEL AIRPLANES, Hand Launched

Class C

			New Weight Rule	Old Rule
Junior:				
	Alvie Dague	Tulsa, Okla.	.....	21m 04s
	†Robert Guilfoy	St. Louis, Mo.	2m 57s	.....
Senior:				
	Harry Cornish	Denver, Colo.	.....	61m 09s
	†Alvie Dague	Tulsa, Okla.	33m 02s	.....
Open:				
	Joseph Frady	Tulsa, Okla.	.....	27m 07s
	†Bernarr Anderson	Akron, Ohio.	12m 52s	.....

Class D

Junior:				
	Fred Skafec	Akron, Ohio.	.....	8m 21.6s
	†Henry Falkowski	Buffalo, N. Y.	20m 11s	.....
Senior:				
	Daniel Clini	Springfield, Mass.	.....	38m 50s
	†Edward Swort	Chicago, Ill.	2m 35.5s	.....
Open:				
	Chester Lanzo	Cleveland, Ohio.	.....	18m 10s
	†Chester Lanzo	Cleveland, Ohio.	7m 55s	.....

STICK MODEL AIRPLANES, R. O. W.

Class C

Junior:	No records established			
Senior:	Larry Low	New York, N.Y.	None established	2m 00s
Open:	Nor records established			

Class D

Junior:	No records established			
Senior:	Larry Low	New York, N.Y.	None established	1m 12s
Senior:	Malcolm Abzug	New York, N.Y.	None established	1m 12s
Open:	No records established			

GLIDERS, Hand-Launched

Class B

*Junior:	Martin Phillips	Everett, Mass.	1m 42.8s
*Senior:	Sydney Wallerstein	Boston, Mass.	12m 57s
*Open:	Bruno Marchi	Medford, Mass.	46s

Class C

Junior:	Horace Smith	Jacksonville, Fla.	36s
Senior:	Colin Edwards	Oswego, N. Y.	6m 30.4s
Open:	James McPheat, Jr.	New York, N. Y.	31.5s

Class D

Junior:	No record established		
Senior:	Edward L. Smith	Jacksonville, Fla.	38s
Open:	No record established		

GLIDERS, Tow-Launched

Class C

Junior:	Ralph Brown	Arlington, Mass.	9m 32s
Senior:	Bob File	Columbus, Ohio.	23m 13s
Open:	Everett Tasker	Boston, Mass.	4m 25s

Class D

Junior:	Paul Durup	Boston, Mass.	57.8s
Senior:	Dick Everett	Elm Grove, West Va.	2m 38s
Open:	Roland Buhrig	Canostota	1m 18s

Class E

Junior:	No record established		
Senior:	Jack Smith, Jr.	Dayton, Ohio.	1m 23.4s
Open:	No record established		

CABIN FUSELAGE, R. O. G.

Class C

			New Weight Rule	Old Rule
Junior:				
	Fred Smith	Denver, Colo.	.....	27m 40s
	†Irving Kovnat	Chicago, Ill.	2m 30s	.....
Senior:				
	Robert Cahill	Indianapolis, Ind.	.....	33m 00s
	†Roy Stoner	Rockford, Ill.	12m 52.2s	.....
Open:				
	R. H. Bodle	Akron, Ohio.	.....	61m 31s
	†R. H. Bodle	Akron, Ohio.	1m 51s	.....

Class D

Junior:				
	Arthur Koslow	Philadelphia, Pa.	.....	9m 47s
	†Robert Guilfoy	St. Louis, Mo.	1m 32s	.....
Senior:				
	William Ying	Rosebank, Staten Island	.....	41m 19s
	†Alvie Dague, Jr.	Tulsa, Okla.	22m 01.2s	.....
Open:				
	Chester Lanzo	Cleveland, Ohio.	.....	48m 45s
	†Richard Korda	Cleveland, Ohio.	54m 13s	.....

Class E (Gasoline Engine)

Senior:				
	Bernarr Anderson	Akron, Ohio.	.....	81m 03s
	†Fiske Hanley	Fort Worth, Texas	50m 29s	.....
Open:				
	Don Spaulding	Denver, Colo.	.....	63m 07.4s
	†Maxwell Bassett	Philadelphia, Pa.	70m 02s	.....

CABIN FUSELAGE MODELS, R. O. W.

Class C

Junior:	No records established			
Senior:	Alan Orthoff	New York, N. Y.	None established	1m 07s
Open:	No records established			

Class D

Junior:	No records established			
Senior:	Louis Milowitz	New York, N.Y.	None established	1m 14.3s
Open:	No records established			

AUTOGIROS, Launching Optional

No Classes for Size

Junior:	No records established			
Senior:	Ralph Kummer	St. Louis, Mo.	None established	2m 06s
Open:	No records established			

HELICOPTERS, Launching Optional

No Classes for Size

Junior:	No records established			
Senior:	No records established			
Open:	No records established			

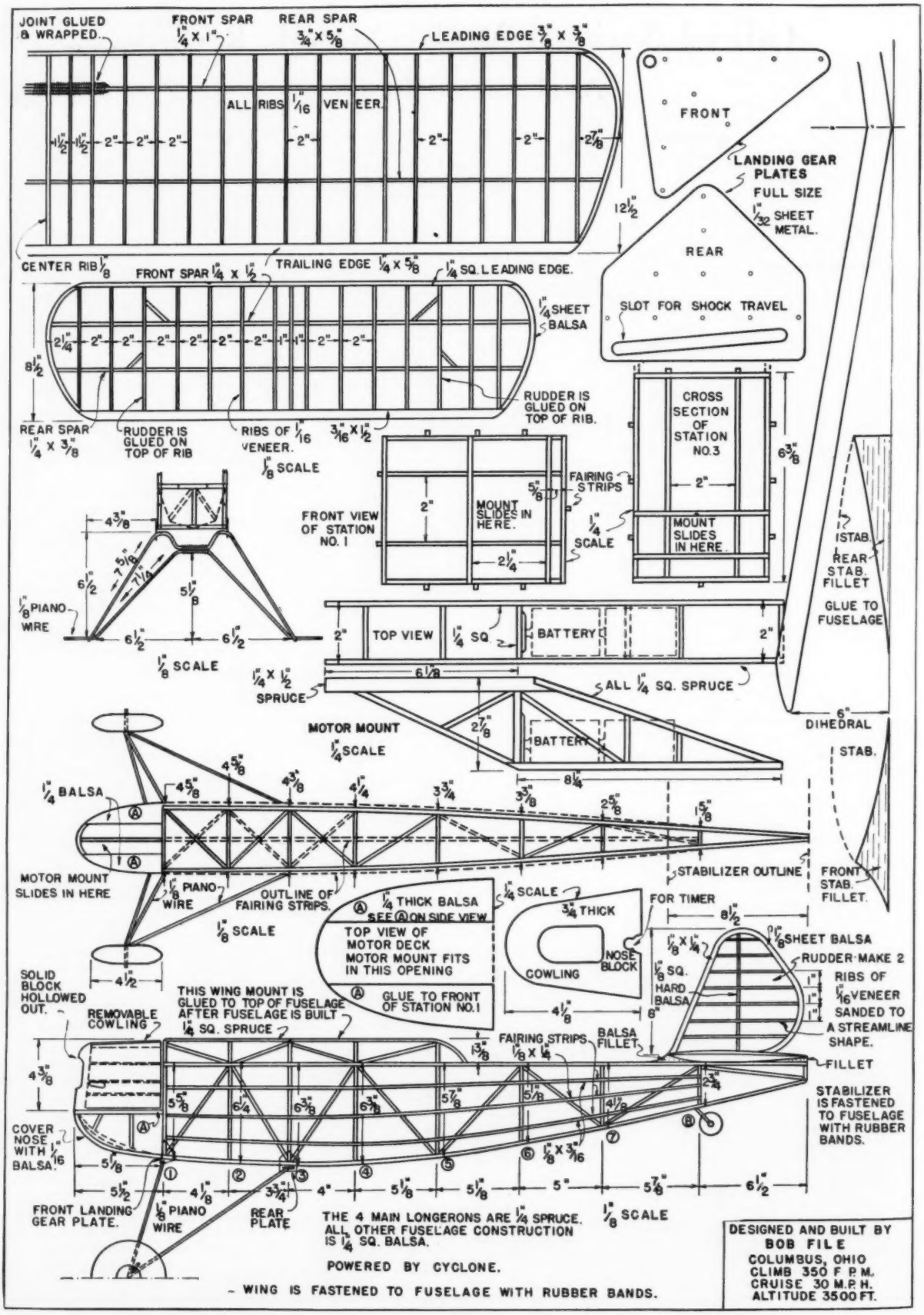
ORNITHOPTERS, Launching Optional

No Classes for Size

			New Weight Rule	Old Rule
Junior:	No records established			
Senior:	†Leonard Elgenson	Chicago, Ill.	06s	.....
Open:	No records established			

*New National Outdoor records established since last listing of February 28th, 1937.

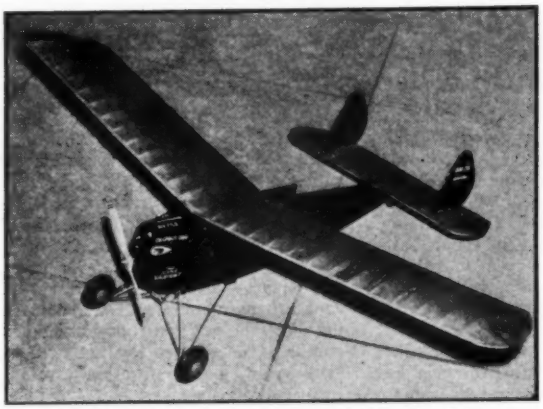
†National Outdoor records established under new Outdoor weight rule.


JOINT GLUED & WRAPPED.
FRONT SPAR 1/4" X 1"
REAR SPAR 3/4" X 5/8"
LEADING EDGE 3/8" X 3/8"
ALL RIBS 1/16" VENEER.
1 1/2" 1 1/2" 2" 2" 2" 2" 2" 2" 2 7/8"
12 1/2"
CENTER RIB 1/8"
FRONT SPAR 1/4" X 1/2"
TRAILING EDGE 1/4" X 5/8"
1/4" SQ. LEADING EDGE.
1/4" SHEET BALSA
2 1/4" 2" 2" 2" 2" 2" 2" 1" 1" 2" 2"
8 1/2"
REAR SPAR 1/4" X 3/8"
RUDDER IS GLUED ON TOP OF RIB
RIBS OF 1/16" VENEER.
3/16" X 1/2"
RUDDER IS GLUED ON TOP OF RIB.
1/8" SCALE
FRONT
LANDING GEAR PLATES
FULL SIZE
1/32" SHEET METAL.
REAR
SLOT FOR SHOCK TRAVEL
CROSS SECTION OF STATION NO. 3
2"
6 3/8"
MOUNT SLIDES IN HERE
FRONT VIEW OF STATION NO. 1
2"
MOUNT SLIDES IN HERE.
2 1/4"
5/8"
FAIRING STRIPS
1/4" SCALE
ISTAB.
REAR STAB. FILLET
GLUE TO FUSELAGE
4 3/8"
6 1/2"
7 5/8"
7 1/4"
5 1/8"
1/8" PIANO WIRE
6 1/2"
6 1/2"
1/8" SCALE
2"
TOP VIEW
1/4" SQ.
BATTERY
2"
1/4" X 1/2" SPRUCE
6 1/8"
ALL 1/4 SQ. SPRUCE
6" DIHEDRAL
MOTOR MOUNT
1/4" SCALE
2 7/8"
BATTERY
STAB.
1/4" BALSA
4 5/8"
4 5/8"
4 3/8"
4 1/4"
3 3/4"
3 3/8"
2 5/8"
1 5/8"
8 1/4"
STABILIZER OUTLINE
FRONT STAB. FILLET.
MOTOR MOUNT SLIDES IN HERE
1/8" PIANO WIRE
OUTLINE OF FAIRING STRIPS.
1/8" SCALE
A 1/4" THICK BALSA SEE A ON SIDE VIEW
TOP VIEW OF MOTOR DECK MOTOR MOUNT FITS IN THIS OPENING
A GLUE TO FRONT OF STATION NO. 1
1/4" SCALE
3/4" THICK
NOSE BLOCK
COWLING
FOR TIMER
8 1/2"
1/8" SHEET BALSA
1/8" X 1/4"
RUDDER MAKE 2
1/8" SQ. HARD BALSA
1" 1" 1"
RIBS OF 1/16" VENEER SANDED TO A STREAMLINE SHAPE.
SOLID BLOCK HOLLOWED OUT.
4 1/2"
THIS WING MOUNT IS GLUED TO TOP OF FUSELAGE AFTER FUSELAGE IS BUILT
1/4" SQ. SPRUCE
REMOVABLE COWLING
4 1/8"
6"
FAIRING STRIPS 1/8" X 1/4"
BALSA FILLET
FILLET
3/8"
4 3/8"
5 5/8"
6 1/4"
6 3/8"
6 3/8"
5 7/8"
5 1/8"
4 1/8"
2 3/4"
STABILIZER IS FASTENED TO FUSELAGE WITH RUBBER BANDS.
COVER NOSE WITH 1/16" BALSA.
5/8"
1/8" X 3/16"
5 1/2"
4 1/8"
3 3/4"
4"
5 1/8"
5 1/8"
5"
5 7/8"
6 1/2"
FRONT LANDING GEAR PLATE.
1/8" PIANO WIRE
REAR PLATE
THE 4 MAIN LONGERONS ARE 1/4" SPRUCE. ALL OTHER FUSELAGE CONSTRUCTION IS 1/4" SQ. BALSA.
1/8" SCALE
POWERED BY CYCLONE.
- WING IS FASTENED TO FUSELAGE WITH RUBBER BANDS.
DESIGNED AND BUILT BY
BOB FILE
COLUMBUS, OHIO
CLIMB 350 F P M.
CRUISE 30 M.P.H.
ALTITUDE 3500 FT.

How to Build the "Little Varmint"

Here's a Novel Gas Model That Is a Fine Performer And Easy to Build

By BOB FILE



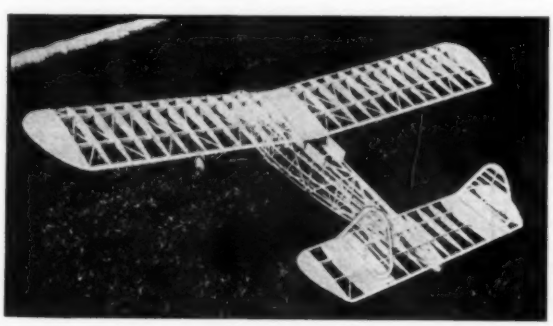
The finished plane is compact, light and efficient

HERE are the complete plans for a six foot gas job that has had many hours in the air over a period of over a year and is still going strong. It has shown excellent stability which is proven by the fact that it is still flying. The model has given a good account of itself in many contests, its official altitude on ¼ oz. of gas was 3200 ft. which was registered by a real plane. This was one of the first gas models to appear with the twin rudders. The complete weight ready to fly is 3½ lbs.

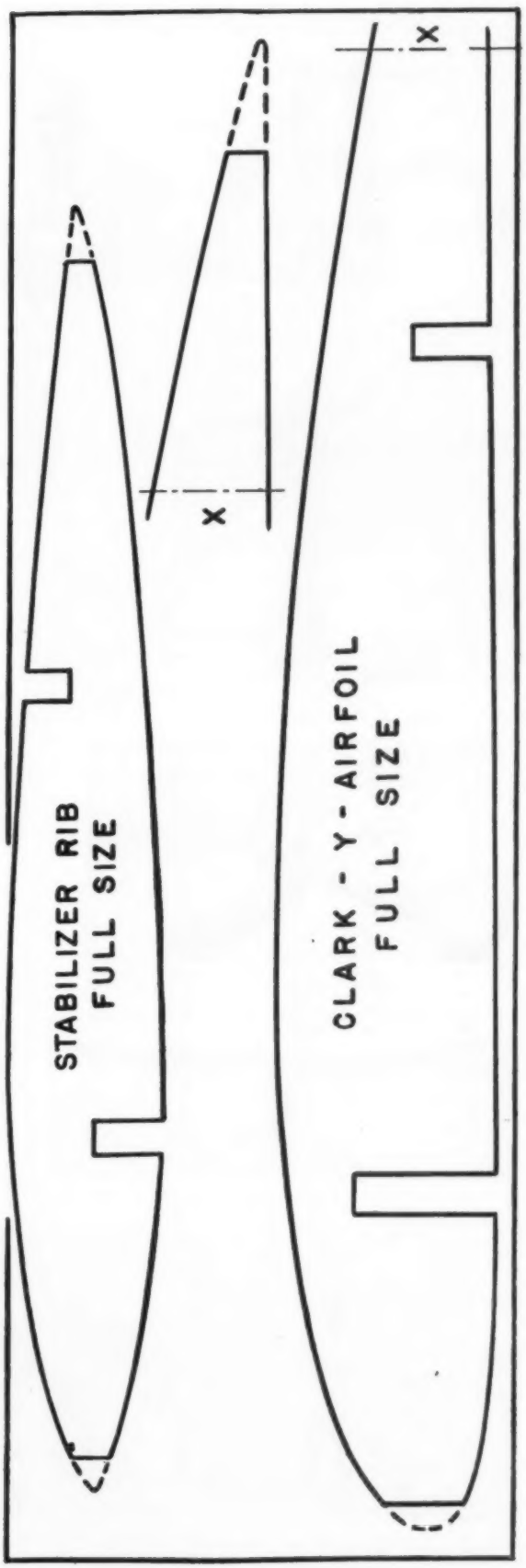
Fuselage

The fuselage which is always the hardest part of a model to build should be constructed first. First lay out a full size side view of the fuselage on a large sheet of wrapping paper and from the plans mark off the different stations according to the dimensions starting from Station No. 1. The four main longerons should be spruce as well as the cross pieces at Stations No. 1 and No. 3. These stations take the stress of the landing gear and require more strength. All the fuselage construction with the exception of the fairing strips should be of ¼ sq. After the two sides are built they are joined together using the dimensions given in the top view on the plans. The fairing strips are of medium balsa, the top strip which is not shown on the plans is of ⅛ sq. and is glued to the outside of the top longeron, the second strip from the top is ⅛ x 3/16, the third or the center strip being the deepest is ⅛ x ¼ while the bottom side strip is ⅛ x 3/16. On the bottom of the fuselage only one fairing strip is used and that is ⅛ x ¼ which is glued to the center of the fuselage. The top of the fuselage has 2 fairing strips

(Continued on page 56)



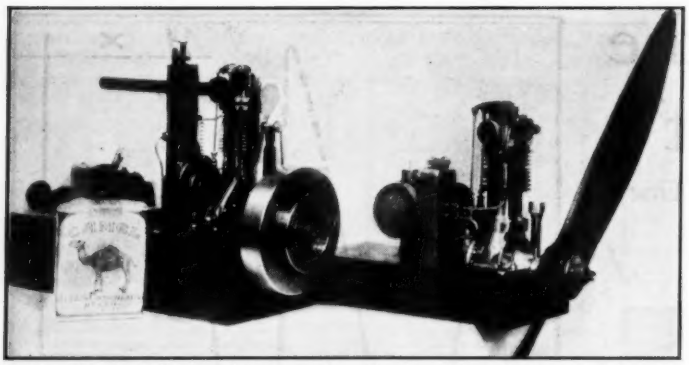
The uncovered framework showing details of its construction. Note the rests for the wing which allow adjustment



"Gas Lines"

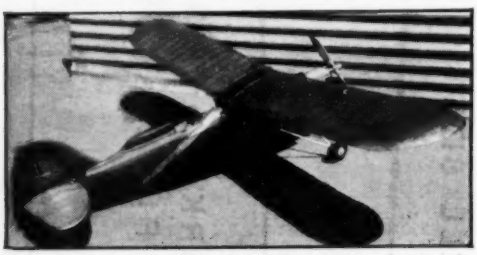
What Gas Model Builders in All Parts of the World Are Doing to Increase the Knowledge of Aviation

The I.G.M.A.A. Pin

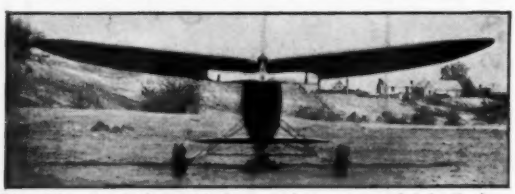


Pict. No. 1. Miniature Diesel engines developed for airplanes and boats

Pict. No. 2. A new dancing step inspired by a speedy gas model on the rampage



Pict. No. 3. A gas job of excellent design by Ralph Guernsey. The fuselage is made of alderwood



Pict. No. 4. A fast 5½ foot racing gas model built by John Czajkowski and Douglas Hunt

IT IS extremely interesting to note the trend of the development of gas model aviation. Though gas model builders do not always have extensive contacts outside of their own community which would help to give them a clear picture of the development of the art throughout the country as a whole, those builders who read "Gas Lines" and keep in close contact with outside activities have a fair understanding of the situation.

The many letters received by your editor indicate that the adult following in gas model aviation is increasing very rapidly. Whereas rubber-powered model flying was considered a toy by the average older person, he or she looks upon the gas model as something worthy of what he considers to be his superior knowledge and experience. As a matter of fact, adults "have gone crazy" about gas models. We expect soon to see a large increase in the number of inmates in the insane asylums.

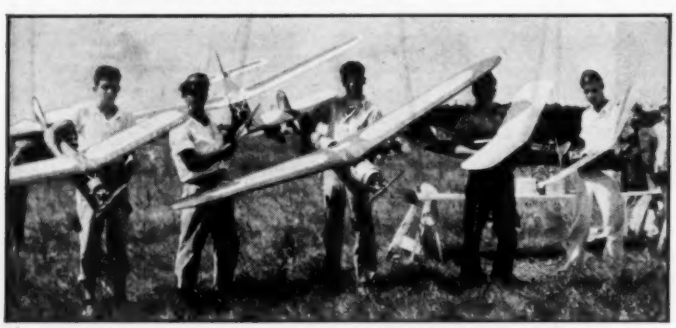
By the way, here is another point that enemies of gas models could use against the builders, that is, the increase in insanity. This argument would be just about as good as others they have presented.

This brings us to another important bit of news. Gas model builders have little to worry about at present concerning the program to eliminate gas models from the lives of many aeronautic experimenters. Word has been received from responsible sources that all efforts have ceased to suppress gas models except in states in which bans have already been established. Evidently the organizations which have been more or less jealous of the success of gas models compared to rubber models have given up the fight as a hopeless one. At least their aggressive attitude has died down to the zero point. Nevertheless, all gas model fans should not feel that the danger is over entirely. They should be on the alert for any situations arising which may tend to restrict the art. Otherwise, "keep your powder dry" in case of any further developments.

One of the many reasons why the campaign against gas models has failed has been due unquestionably to the fact that those who have initiated this campaign made the mistake of considering gas model builders as youngsters. Most of the rubber power model builders are below the age of sixteen. However, the average age of gas model builders is about twenty-one. In fact, at least half of the builders of this type of machine are adults. This fall more gas model contests have been held than during any similar period in the history of the art. At most of the contests the spectators have run into the thousands. A little thought on this will give you some idea as to the power of gas model aviation in making America air minded.

One of the most unusual developments in the field that has come to our attention this month is a miniature Diesel type engine. To our knowledge this is the smallest Diesel engine ever built to run successfully. The builder of these engines requests that we do not publish his name at this time. However, we will tell you something about them.

First of all, picture No. 1 gives you some idea of its size as compared with a



Pict. No. 5. Five members of the Jacksonville, Fla., Gas Model Club at a contest held at Paxton Field, Sept. 5th

Pict. No. 6. Edwin Elliott and his first plane built in 1934. He flies at the regular San Diego Sunday contests

Pict. No. 10. "Gassing up" one of the contestants' planes at the Philadelphia contest

Pict. No. 7. A view of the recent Philadelphia, Pa., contest. Note the tent, used as headquarters

package of cigarettes. The designer says:

"They are superior to gasoline engines for powering model planes in several respects. First, there is no fire hazard, as the fuel used is non-vaporizing and non-explosive. (Provided there actually is a fire hazard when fractions of an ounce of gasoline are used.) Second, dampness or moisture have no effect on the engines; the engines operate exactly the same in rain as in dry weather. Third, they are especially suitable for radio controlled airplanes, as there is no electricity used on the engines at all. Therefore there is no interference with radio. Fourth, the actual horsepower developed per ounce of weight, in complete running order, is more than any gasoline engine now on the market. Fifth, they are much easier to start, and run more consistently than small gasoline engines. Sixth, they will run twice as long as the gas engine on the same amount of fuel.

Both of these engines are equipped with an original type of fuel pumping system, which successfully measure and injects the proper quantities of fuel, so that there is no missing, and a clear exhaust is maintained. The engines operate entirely on the Diesel principle of ignition solely from the heat of compression, and are started cold, without pre-heating of any part of the mechanism.

We feel this is the most remarkable development which has come to the gas model field and hope these engines will soon be available in quantities to gas model fans.

If you want to see action take a look at picture No. 2. It gives you the impression of a Scottish sword dance, using an airplane in place of swords. One might imagine that the gentleman in the picture is Fred Astaire. However, it is merely one of the model builders of San Diego, California, in the act of side-stepping a speeding gas job at a recent contest. The picture was made by W. H. Curtiss of San Diego and sent to us by Elbert J. Weathers, of 2720 Poinsettia Drive, San Diego, Calif.

Picture No. 3 is a shot of a very well-designed gas job. At first appearance one might think it is a biplane. However the apparent lower wing is merely a shadow. It was designed and built by Ralph Guernsey of Posey, Calif. He says:

"The fuselage is constructed almost entirely of alderwood, which I consider stronger and lighter than bass. I cut the wood myself and milled it from the log.

"The timer, switch and radio jack are in the cockpit. The section around this lifts up so as to give easy access to wiring, etc. The wing is of the KG section, with a chord of ten inches and a span of seventy inches, a dihedral of one inch per foot of span on each side. The motor is an inverted Ohlsson and will ultimately be cowled in. There are cooling tunnels on each side of the nose to provide adequate cooling when flying with the cowl in place. The whole model ready to fly weighs close to four pounds.

"I have not flown the model yet, due to poor flying fields in the vicinity, having decided to wait till I can give it the best of chances."

Pict. No. 8. Bill Effinger's Super-Buccaneer which won first place in the limited motor run event at "Philly"

Pict. No. 9. A gas job that is "different." The tail planes are mounted on two booms attached to the wings

Picture No. 4 shows a rather unusual model. It is a 5½ foot parasol streamline job, built by Douglas Hunt and John Czajkowski of 12 Arlington Avenue, South River, N.J. These boys are members of the South River High School unit of the I.G.M.A.A. Czajkowski says that by collaborating with another boy in making a model the individual cost is reduced considerably. It took about a month to complete. It has a wing span of sixty-six inches, a chord of ten inches, dihedral of 4½ inches. The wings are elliptical in shape. An R.A.F. 32 airfoil was used. The whole machine weighs about five pounds. With its small wing span and fairly heavy weight the ship should be a fairly speedy job. There are many new unique features about the ship. The builders write us the following information on it:

Pict. No. 11. Charles Vogel of the Milwaukee "Helldivers" club and his scale model Rearwin

"The wing mount consists of two separate plywood supports which keeps the wing

Pict. No. 12. Peter Bowers illustrates the condition of many model builders while trying to finish their planes the night before a big contest

Pict. No. 13. A view of one of the large regular contests held at Yakima, Wash.

Pict. No. 14. Roscoe McLeran and his perfect scale Stearman-Hammond gas model. It is beautifully made

about an inch and a quarter above the top of the fuselage. There are no exterior braces on this wing mount. They are removable and easily attached with two small bolts. When the mount is in the fuselage it is held rigidly in two grooves atop the fuselage. The wing is tied on the mount with rubber and offers a neat appearance.

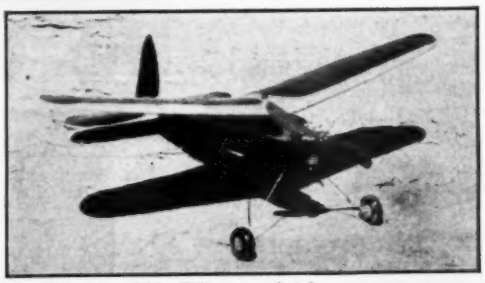
"The fuselage has two trap-doors for inspection in the front. One long one is on the side for inspection of the wing mount moorings and motor mount moorings. The bottom trap is somewhat smaller and covers the landing gear attachments.

"Since they are not removed very often, two small screws hold them in securely and whenever necessary are removed. The tail group is held on by rubber on two hooks on the fuselage, one in front and one in back of the tail. This arrangement is not very conspicuous. The motor is cowled in two parts. The bottom part is a permanent part of the fuselage and is carved from balsa. The top part is of sheet aluminum and is clipped on. In the picture the top part is removed.

"The landing gear is practically foolproof. It projects out to the nose of the plane and prevents nosing over. It is very shock absorbing and has streamline air wheels. The timer we use at present is a Kodak timer held to the firewall by an aluminum clamp pointing downward. When it releases it hits a push-pull switch on the motor mount.

"Before we attempted to give the ship any actual flight tests, we glide-tested it thoroughly. We also found that it balanced perfectly at a predetermined point. The first real test came Saturday, May 15th. We took it out to Hadley Field in a fairly still breeze (about 30 m.p.h.). At first we were undetermined as to whether to bide our time or send it up in the gale and keep our fingers crossed. We finally did the latter. We adjusted the timer for about 20 seconds and let the motor run slowly for the first test flight. It climbed fairly steadily but stalling slightly. However when the motor cut it landed perfectly. After adjusting the tail to eliminate the stall we cut down the time to 10 seconds and gave the motor the gun. The plane climbed steeply and quickly to an altitude of 150 feet before the motor cut. It flattened into a glide immediately and glided in large flat circles till it was about 10 feet over the airport. Then a strong gust of wind from a large plane taking off knocked the model on its wing and it came down on its nose and turned over. The only thing broken was a prop and the tail block, which had not been on securely.

"On all these tests the model showed remarkable stability and recover characteristics."



Pict. No. 15. This Elf-powered job, the smallest at the Yakima contest, won two events

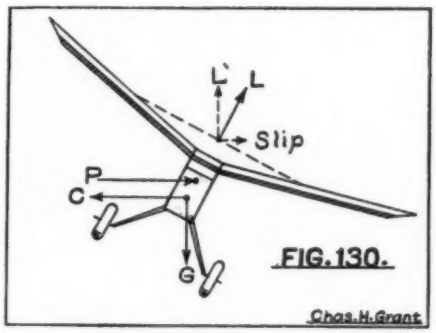
On Sunday, September 5th, a contest was held by the Jacksonville Model Airplane Club at Paxton Field, Jacksonville, Florida. Picture No. 5 shows five of the gas model entrants. There were nine in all who competed. The gas model event was won by Frank W. McCormick of Jacksonville. We are indebted for this information to Mr. W. L. Timpone, leader of the Jacksonville unit of the I.G.M.A.A. and the contest director.

We have a letter from Edwin Elliott of Salinas, California, Box 569. Mr. Elliott is a member of I.G.M.A.A. Unit No. 67. He tells us that in Salinas they have no convenient spot to test out their gas jobs. However they make use of several pastures. The only difficulty about these is that they are covered with long grass and sagebrush in which cattle graze. Nevertheless, they are persistent to accomplish so much under these adverse conditions. Mr. Elliott says that they are careful not to take any red gas models to such localities for fear of running into difficulties with the bulls among the cattle. We would say certainly that interest in gas models is intense when model builders go to these extremes to fly them. In spite of this Unit No. 67 manages to send delegates to contests held each Sunday in San Diego and Santa Cruz. Picture No. 6 shows Elliott and his

(Continued on page 58)

Pict. No. 16. Claude Woodworth and his racing gas model of perfect design

Pict. No. 17. This T-D Coupe has been improved by fairing the landing gear



Designing Your Gas Model

How Gas Model Designs Have Been Developed From Rubber-powered Models and How the Two Types Differ

By CHARLES HAMPSON GRANT

Chapter No. 5

Article No. 68

MOST of the first gasoline engine powered miniature airplanes to be designed and built were produced by aviation enthusiasts whose training in and conception of model airplanes was derived from the rubber-driven variety. It is not surprising therefore that they reflected the principles of design common to the rubber-powered type of model. This procedure was correct, as far as it went.

However, when these planes were flown, frequently unexplainable maneuvers and crashes made it apparent to observing gas model designers that something was being overlooked in the design of their craft. Some believed the trouble lay in their technique of flying. These, through practice and hours spent in careful adjustment of wings, stabilizers, and rudders were able to obtain occasional fine flights. However, in nearly every case such ships lacked the *consistent* flying qualities of a well-designed "gas" plane. Even now the majority of the models being designed and built must be placed in this class.

Without question the reader has seen a persistent "gas" model fan attempt one flight after another, vainly endeavoring to solve the difficulties by some trick adjustment until a complete washout of his "brain child" prevented further experiments. Such builders are more persevering than thoughtful.

It has been evident to those who have been more scientifically inclined that their troubles have been due to something other than adjustment when their planes have flown in an erratic and inconsistent manner. Designers of this class usually have proceeded to check over their designs in *light of their experience with rubber-powered craft,* believing errors in design to be the cause of the uncalled-for behavior. Invariably they have found that their planes embodied the *correct* design factors. However they have overlooked the fact that *all* of the required design factors have not been incorporated in their planes. Only a few certain factors are necessary in the design of rubber-powered planes while, because of the greater weight and speed of gas models, additional design considerations enter the problem. In the majority of cases the rubber-powered model designer, who for the first time undertakes to design a "gas job," overlooks this fact completely.

A common procedure followed by the model builder under these conditions is to build one model after another changing or modifying the design of each until he hits upon one that produces the results he desires. In other words he develops a successful gas job by a cut and try method. The disadvantage of this system is that he does not know *why* it is successful. Therefore he cannot build a well-designed model of another type without another long series of cut and try experiments.

After all, the problem of the model engineer is not to build merely a successful gas model plane. It is to discover the fundamental principles governing the design of such models so that he may use them to design all types of successful gas models without undergoing long and tedious experiments in order to determine the correct proportions of each type.

Many model designers have recognized that this is the secret of producing planes that fly consistently. Thereupon they have applied themselves diligently to the study of aerodynamics, mechanics and other sciences that would enable them to comprehend the nature and action of the factors embodied in the design of gas models. The results obtained by model builders of this type have more than repaid them for their labors.

What is this mysterious difference between gas models and the rubber-powered variety that has so disturbed the ego of many who believed themselves masters of the art of model design? Why cannot a gas model be designed entirely according to principles essential in the proportioning of "rubber" models? The logical procedure in order to discover the reason is to compare the two types in light of their physical and aerodynamic characteristics. From experience it has been determined that a gas model may be proportioned in every visual respect, exactly the same as a rubber-powered plane, and yet it may perform in an entirely different manner. Evidently this is caused by a difference that is not apparent to the eye. This leads us right up to the front door of the mystery. When scanning the other differences that might exist, one of the first ones that makes itself evident is the difference in weight per square foot of wing area. Whereas a "rubber model" wing carries only about two to three ounces of weight per square foot, the wing of a gas model supports from eight to fourteen ounces per square foot. In other words the gas model is heavier in proportion to its size. Possibly we have something here. Let us see.

It is customary to think of the weight of an airplane as acting straight downward; the lift on the wings acting upward to the same degree of intensity. This condition exists only in normal level straight flight. Obviously a plane must be designed to fly with efficiency and stability while turning, climbing, gliding and performing other customary maneuvers. How does the weight of an airplane act under such conditions? For instance, what happens when the plane executes a turn to the left? While it is turning gravity still acts directly downward but centrifugal force is generated which acts horizontally to the right with an intensity proportional to the mass or weight of the airplane. The point at which this force acts is the center of gravity. In other words, the heavier the airplane is, the greater will be the centrifugal force (acting

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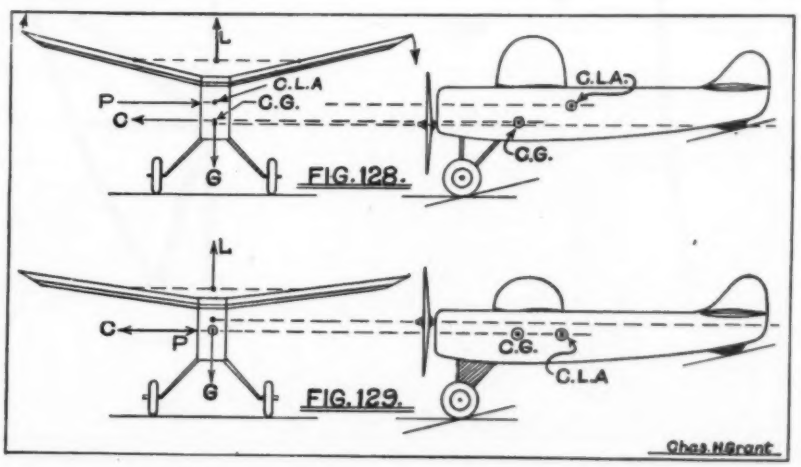

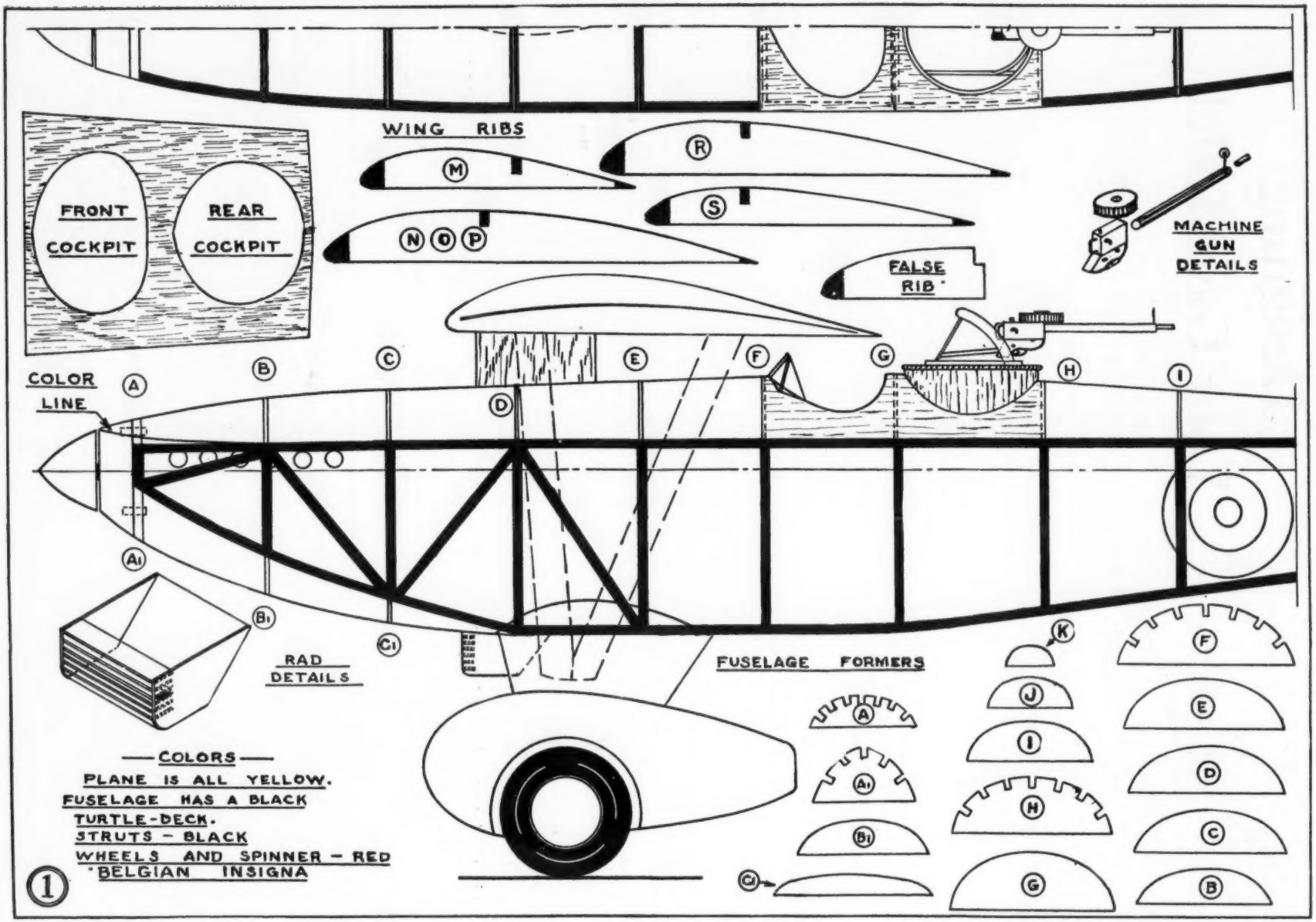
WING RIBS
M
R
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FRONT COCKPIT
REAR COCKPIT
FALSE RIB
MACHINE GUN DETAILS
COLOR LINE
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C1
RAD DETAILS
FUSELAGE FORMERS
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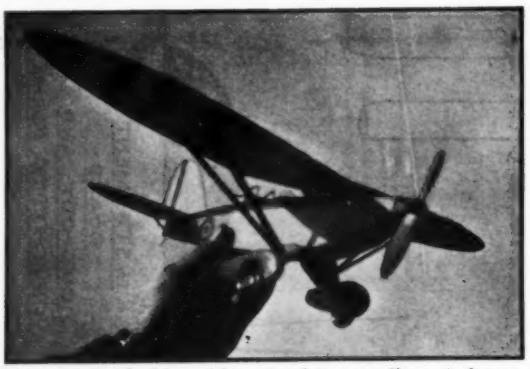
C1
—COLORS—
PLANE IS ALL YELLOW.
FUSELAGE HAS A BLACK TURTLE-DECK.
STRUTS - BLACK
WHEELS AND SPINNER - RED
*BELGIAN INSIGNA
1

Build This Flying Renard R-31

How You Can Create a Most Realistic Flying Scale Model of One of Belgium's Foremost Observation Planes. It Is an Excellent Flier

By ROBERT HARRISON



The completed ship with a "scale" propeller. A larger "prop" is used when the model is to be flown

BELGIUM may be a small country but its planes rank among the world's best as far as performance is concerned. The Renard factory is a relatively new concern in the manufacture of high performance military aircraft, but even so the Renard R-31 and R-32 can hold their own with any similar military craft. The R-31 and the R-32 both have the same basic design but the R-31 has a Rolls Royce Kestral engine while the R-32 has a Gnome-Rhone Mistral Major power plant. We shall describe the construction of the R-31 since its long sleek nose cowling lends itself very well to model building.

The real Renard R-31 is intended for high speed, long distance reconnaissance duties. It carries wireless and photographic apparatus in addition to three machine-guns. The construction is entirely in metal with the exception of the covering. A maximum speed of 200 m.p.h. is claimed, while the climb to 19,700 ft. takes 14 min. 34 sec. Main dimensions are; span 47 ft. 3 in., length 30 ft. 2 in., wing area 345 sq. ft. Now let's get down to the actual building of this interesting foreign machine.

Wings

Both wing panels are laid out full size. Cover the plans with a sheet of wax paper and pin a piece of 3/16"x3/16" strip balsa in place for a leading edge. Pin a strip of ⅛"x1/16" balsa in place for the trailing edge. Trace the outline of the wing tip pieces on a sheet of balsa 1/16" thick and cut to shape with the edge of a broken razor blade. Cement these pieces in position as shown on the plans. While these are drying, you can be cutting the ribs from a sheet of 1/16" sheet balsa wood. There are four different size ribs shown on plate 2 besides the false rib. Cement these ribs in position and after these have dried a while, cement the top spar ⅛"x1/16" in the slots provided in the ribs. Lay the wings aside and go to the tail units. Incidentally you can join the two sections and give each wing tip 7/16" dihedral and allow this to dry while you're working on the tail surfaces.

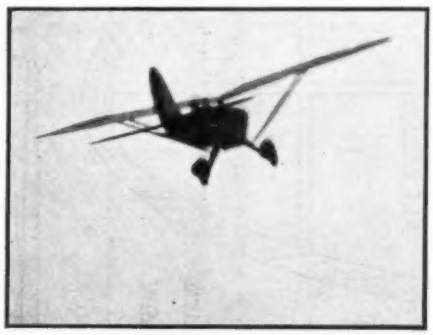
Tail Surfaces

Cover the plans with wax paper as before and then cut the outline pieces for the rudder and the elevators from a sheet of 1/16" sheet balsa. Cement these together and pin in place on the plans. Cut pieces of 1/16" sq. balsa strips to the proper length and glue them as shown to form the internal bracing for the tail units. Lay these aside when dry to be covered with yellow paper later.

Landing Gear and Wing Struts

The center section strut is sanded to the shape shown on plate 2 from a piece of ⅛" flat sheet balsa.

The landing gear struts are cut to shape from a piece of ¼" sheet balsa as on plate 2. Be sure to make a right and a left side. The same precaution is to be observed when making the pants. The pants



The model Renard in full flight

are built up from three pieces of ⅛" sheet balsa. Each piece bears the outline shape shown on plate 1, while two of each three pieces has a hole cut in it to accommodate the wheel, as shown. Cement these three pieces together making sure again that you have a right and a left pant.

The wing struts are cut and sanded to a streamline shape from a strip of 1/16"x¼" strip balsa. The actual lengths are shown in the plans. Make two of each size.

Fuselage

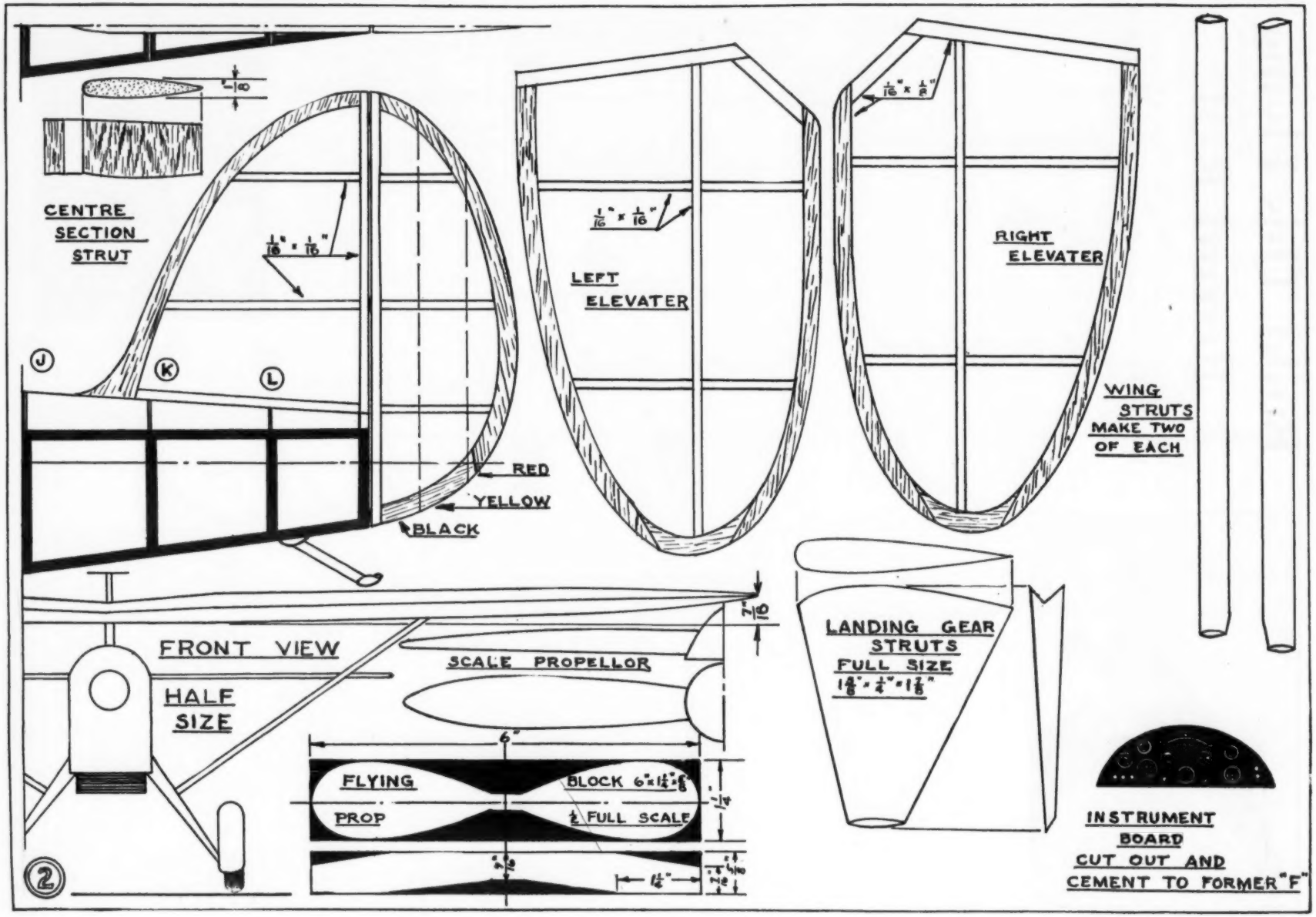
The fuselage longerons 1/16"x1/16" medium balsa are pinned on the plans and uprights of the same size balsa and are cemented in position. Make two sides and assemble them using pieces of 1/16" sq. balsa of the various lengths shown in the top view of the fuselage. While this part is drying, cut out the top and bottom fuselage formers from a sheet of 1/32" sheet balsa. Note that formers A and A1 are cut from 1/16" sheet balsa. Cement these in place. Pin a block of balsa ¼"x¾"x1" to the nose of the body temporarily and sand to the shape of the nose block in the plans. When this is done, two small 1/16" reed dowels are inserted into the block so as to fit into two holes drilled in formers A and A1. The top and bottom fuselage stringers are now glued in place and the cockpit cover is cut from a sheet of 1/64" sheet balsa and cemented in place. The Scarff gun ring is also cut from 1/64" sheet balsa and is cemented around the inner edge of the rear pit. The machine-gun can be made from the plans without any further instructions. Cut out the instrument board in the plans and cement it to the front cockpit former. Make a rear hook from a short length of 14 gauge piano wire and attach in the position shown.

Covering and Assembling

The various parts are now ready for covering. It is suggested that you cover them all with yellow Jap tissue and spray with water to tighten. The top deck or turtle-back of the fuselage is covered with black tissue, as are the wing struts. The wheels are painted red as well as the spinner. Use Belgian insignia—a black center circled with a ring of yellow which in turn is circled with a ring of red. After the fuselage has been covered cut small pieces of ⅛" reed and cement to the side of the nose to represent exhaust stacks. Paint these black or silver as desired. When all the parts have been covered, we are ready to assemble them. The first step is to cement the tail units in place. The center section strut is cemented to the fuselage and then the wing is fastened to it. Cement the pant legs in position and then set the wing struts as shown. Run a small piece of 14 gauge music wire through the hub of the wheel, pass it through the pant and bend it so as to pass straight up the landing gear leg. The dummy radiator is built up of 1/64" sheet balsa as shown

(Continued on page 46)

How it looks from above. Note the simple wing construction. It's easy to build


CENTRE SECTION STRUT
1/16" x 1/16"
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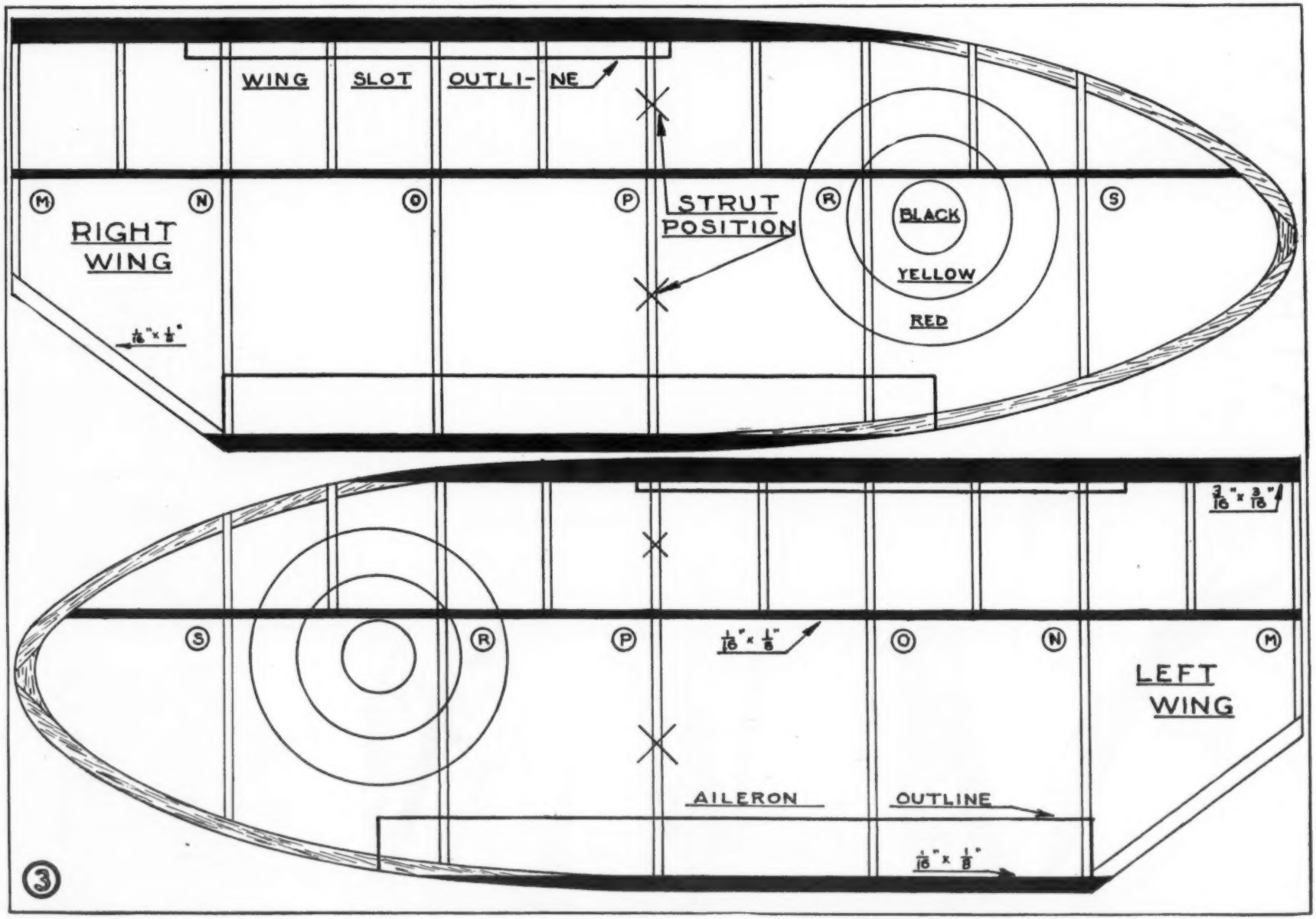
YELLOW
BLACK
FRONT VIEW
HALF SIZE
2
LEFT ELEVATER
1/16" x 1/16"
RIGHT ELEVATER
1/16" x 1/8"
WING STRUTS MAKE TWO OF EACH
LANDING GEAR STRUTS
FULL SIZE
1 1/8" x 1/4" x 1 7/8"
SCALE PROPELLOR
6"
FLYING PROP
BLOCK 6" x 1 1/2" x 5/8"
1/2 FULL SCALE
1 1/4"
INSTRUMENT BOARD
CUT OUT AND CEMENT TO FORMER "F"


WING SLOT OUTLI- NE
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N
M
LEFT WING
AILERON
OUTLINE
1/16" x 1/8"
3

AIR WAYS

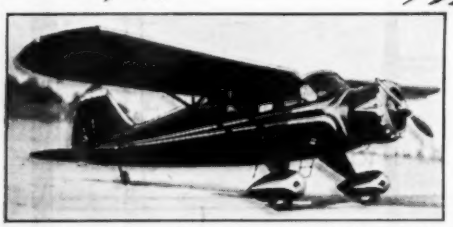
HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Tell Others What You Are Doing

A modernistic sketch of the Supermarine "Spitfire II" by Norman Barker

WE HAVE had a number of contributions from Air Ways Club members this month which are especially deserving of mention. Norman Barker of 139 Evans Avenue, Toronto, Ontario, Canada, again crashes through with a very artistic heading, showing the Supermarine "Spitfire II."

Frank Knorowski of 24 Engel Street, Glen Lyon, Pa., sends us picture No. 1, which shows his most remarkable scale Stinson Reliant. He is Air Ways Club member 758. We are sorry that the builder does not give us any details of the ship's construction. However, the picture of it indicates that exceedingly fine workmanship is embodied in the little plane. Even the tail wheels swivel, as careful observation will show. You will also notice the steps which lead up to the cabin.



Pict. No. 1. A perfect scale Stinson Reliant built by Frank Knorowski. No detail has been overlooked

Pict. No. 2. One of the most perfect scale models ever built. It is a Curtiss JN-4 by Gilbert Miningh. It appears like the large ship with the very realistic painted background

Pict. No. 3. A contest model with unusual characteristics by Carl Reynolds; gull wings and twin rudders

Another old contributor, Gilbert H. Miningh of South Cumberland, Maryland, Box 2121, Station A, shows what the model of his Curtiss wartime JN-4 training plane looks like. It is picture No. 2. This might easily be mistaken for a real ship. The background makes it especially lifelike. This was painted in by Miningh. It appears that this gentleman is a real artist, whether he is using a brush or tools. The ship has a 33-inch wing span and boasts of complete details. Often the propeller on a model gives away the fact that it is merely a model. However, in this case the prop looks very much like a full size one.

Picture No. 3 shows a very unusual contest job, built by Carl T. Reynolds of 121 Fowler Avenue, West Lafayette, Indiana. The ship has several unique features. First of all, the gull wings. It boasts also of three vertical fins. This procedure often cuts down structural weight yet allows the correct amount of fin area. The span is 54 inches. On the wing an R.A.F. 32 airfoil is used. This boasts of 260 square inches of area. The fuselage is 35 inches overall and of the bulkhead and stringer type. The tail has 90 square inches of area and embodies an M.6 airfoil. Eighteen strands of $\frac{1}{16}$" rubber drive a 17 inch diameter, 24 inch pitch propeller. There is a rubber tensioner attached to the motor which keeps it stretched.

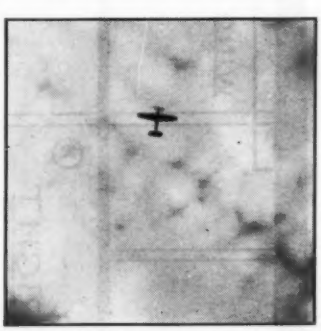
Magnus Andersen of 83 North Burgher Avenue, West New Brighton, New York, has been kind enough to send us a picture of his friend, Martin Rohner, and his six foot towline glider. It is picture No. 4. The ship has made a number of successful flights, but as yet, Andersen says, no record ones due to adverse weather conditions.

Picture No. 5 shows one of the youngest airplane dealers in the country, James Horne, in his establishment. His attic room serves as a workshop and supply house for model builders. He has been carrying on this type of work for two and a half years. Examination of the picture will indicate the variety of material in which he deals. A Curtiss Robin gas model may be seen in the picture.

Many builders are interested in pictures of models in flight, so here are a few. Picture No. 6 shows an all-balsa fuselage model, built by Mr. Grant, in flight over the hills of Vermont. Plans for this model appeared in MODEL AIRPLANE NEWS about two and a half years ago in the series en-

Pict. No. 4. Martin Rohner with 6 ft. glider

Pict. No. 5. James Horne, one of the youngest model plane dealers, in his workshop; has been in the business 2½ years



Pict. No. 6. An all-balsa fuselage model designed by C. H. Grant, in full flight

Pict. No. 8. A most unusual "shot" of John Genco's Curtiss Hawk scale model in flight

Pict. No. 7. Victor Leskowsky's fuselage model in full flight a tHoosick Falls, N.Y.

Pict. No. 9. An "Experimental Tractor" up against the clouds built by LeRoy Erickson from plans in M. A. N.

titled, "Fundamentals of Model Airplane Building." The model was built then and has been flown continuously since that time.

Picture No. 7 shows a fuselage model built by Victor Leskowsky of 51 Parsons Avenue, Hoosick Falls, New York, from plans in the October 1935 issue of MODEL AIRPLANE NEWS. Leskowsky says it has flown about one hundred times with few minor repairs. It weighs three ounces and is powered with ten strands instead of fourteen strands of ⅛" rubber, as specified. Leskowsky must have made a very fine construction job in order to have this ship perform with the fewer number of strands.

Picture No. 8 is a very unusual shot. It is difficult to get photographs of flying scale models in action, especially those of the biplane type. This picture shows a Curtiss Hawk P6-E, built by John Genco of 1239 Waterman Avenue, Fresno, Calif., in actual flight. It has a 20 inch wing span, and though two years old is still in good flying condition. Genco says that he has entered it in five contests and has placed in each one of them. The longest flight is one minute, fifty-five seconds.

Picture No. 9 shows a model of the experimental type, plans for which appeared in the June issue of this magazine. It was built by LeRoy Erickson of 6503 Leighton Avenue, Lincoln, Nebraska, who also snapped it as it passed overhead. He says it flies any way you point it, even straight upward. If pointed upward it climbs straight for about 100 feet and then levels off. Erickson made several changes in the design, however. The wings have been equipped with a speed section.

MODEL NEWS FROM OTHER COUNTRIES

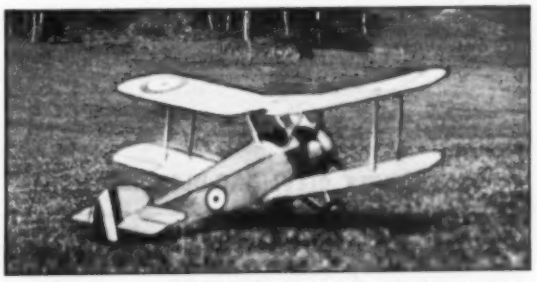
Australia

Picture No. 10 was sent to us by Ivor Freshman of Sydney, Australia. It shows Mr. E. E. Luke, of Kensington, left, and Mr. Allcroft with C. Murdoch's model. Mr. Murdoch is from Maryborough, Queensland. This picture was taken after these gentlemen had competed in the Wakefield finals. Murdoch's model was flown by Mr. Allcroft. The winning model is held by Mr. Luke, who flew it for an average of 1 minute, 24⅓ seconds. The machine weighed eight ounces and had a maximum area of 210 square inches. Murdoch's model averaged 56⅓ seconds.

Mr. Freshman says that he attributes Mr. Luke's victory to the long propeller run produced by the special method of gearing which he applied to his motor.

J. Brown, of Albury, placed second with an average of 1 minute, 11⅓ seconds.

Pict. No. 13. Louis Shock wins the flying scale model event for the third year at the California State Fair

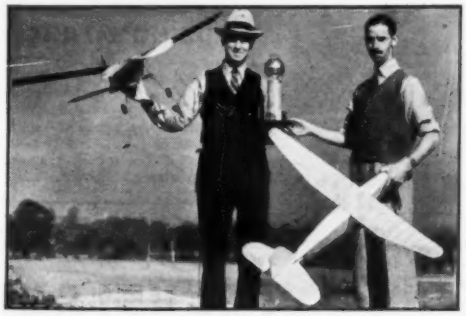


Pict. No. 12. A realistic flying scale model of a Sopwith Camel built by Francis Cooper, Jr., Baguio, P.I.

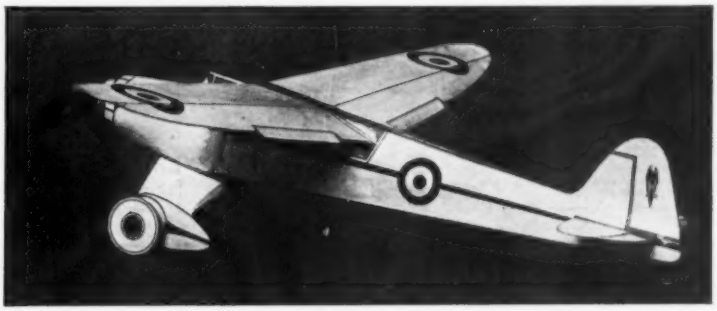
England

One of the most unique models we have ever seen is shown in picture No. 11. It was designed and built by W. Rigby of 45 Valleyfield Road, Streatham, S.W. 16, England. It is made entirely of paper. Obviously this is not Mr. Rigby's first model. He has been making this type of model for a number of years and has become extremely expert in producing this type of plane. He is probably the foremost paper model designer in the world. Designs for these little ships have been printed in many countries. The best part of it is that this model flies beautifully. It has a wing span of fifteen inches. Decoration details give it a very realistic appearance.

(Continued on page 34)



Pict. No. 10. Mr. E. E. Luke and Mr. Allcroft with Murdock's model "cleanup" at the Wakefield finals



Pict. No. 11. Here's a real flying job made of cardboard. Its designer and builder, Mr. W. Rigby, is an expert in the creation of this type of plane

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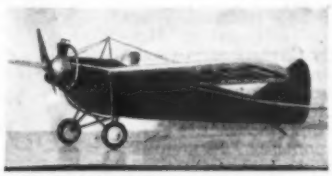

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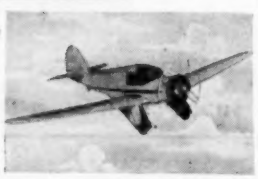

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Air Ways

(Continued from page 31)

Even the flaps are indicated on the wing.

Philippine Islands

Mr. Francis Cooper, Jr., of Baguio, Philippine Islands, writes and sends us picture No. 12, which shows a flying scale model of his Sopwith Camel. With a little increase in the dihedral this plane has proved to be a remarkable little flier.

Denmark

Last month we published pictures sent to us by Mr. Per Weishaupt of Torkel Badens Vej 12, Helrup, Denmark. Mr. Weishaupt has been kind enough to send us also an outline of the development of Danish model aviation. It is as follows:

The Development of Danish Model Aviation

Looking only a few years back you will not see much model aviation in Denmark. Of course there were single model builders, and it happened that a gliding club tried having a model subsidiary, but always without success. No Danish literature on the subject existed, and our only aeronautical paper did not seem to know model aviation. British and German models were not unknown and might be bought in several shops, but few knew how to make them fly.

In August 1934 one of our foremost model builders, Mr. Knud Flensted Jensen, wrote a book, "Modelflyvning". This book contains all-round information on the subject together with plans for two models, the material for which could be bought at the booksellers.

With this book the development really began. Many model pilots who had not believed they could make their models themselves now learned how to do it. And subsequently many set to work on these two models. They were not too good, so they could not really have built up Danish model flying. After having built them I began to build a German gliding-model, the "Baby". It proved to be a great success, and having seen it fly several of my friends began building it too. And then in April 1935 the first real model club was started—called "Odense Modelflyveklub". (Odense is the third-largest town of the country—a town of about 80,000 inhabitants).

After half a year the number of members had grown from 7 to 20, and in the winter season a great number of lectures on different aeronautical subjects were given by members of the club. In January 1936 the club opened the first Danish exhibition which only covered models—no glider or soaring-plane was exhibited.

The club soon got a hundred members and set to work to teach the many newcomers how to build and fly a model airplane. The members built their models in their homes learning by looking at or helping other members with more experience.

In the summer the Danish aeronautical paper "FLYV" got a more popular form, and by collaboration with OM-F it invited boys in all towns of the country to start clubs. Today there are more than 20 clubs. OM-F has held a second pure model exhibition and several other clubs have had exhibitions. In the autumn of 1936 OM-F acquired a workshop and this improved much of the quality of the models, as more experienced members acted as instructors. In the Whitsun this year the first model-aviation camp was arranged by the club in Odense. As the weather was not good there were no great results. In the summer the national broadcasting system tried to make model aviation popular. They did not, however, collaborate with any of the clubs, their little model was not able to fly, and so their competition which was broadcasted became a failure. Something quite different has been done by the flying club of "Berlingske Tidende", the leading Danish newspaper. Through this club it has been made possible for Mr. Flensted Jensen, who is a teacher, to instruct twelve of his colleagues in model-building. They built a very improved version of his gliding-model in his book, and the result has been very good. It is hoped that the teachers will let the boys in the schools build models.

Before mentioning anything about Dan-

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACTS OF CONGRESS OF AUGUST 24, 1912 AND MARCH 3, 1933

Of MODEL AIRPLANE NEWS published monthly at Mount Morris, Ill., for October 1st, 1937, State of New York, County of New York, ss.

Before me, a Commissioner of Deeds in and for the State and county aforesaid, personally appeared George C. Johnson, who, having been duly sworn according to law, deposes and says that he is the Publisher of MODEL AIRPLANE NEWS and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in Section 537, Postal Laws and regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, George C. Johnson, 551 Fifth Avenue, New York, N.Y., Editor, Charles H. Grant, 551 Fifth Avenue, New York, N.Y., Managing Editor, George C. Johnson, 551 Fifth Avenue, New York, N.Y., Business Manager, George C. Johnson, 551 Fifth Avenue, New York, N.Y.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.) Jay Publishing Corporation, 551 Fifth Ave., New York, N.Y.; George C. Johnson, 551 Fifth Ave., New York, N.Y.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of the total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

George C. Johnson, publisher. Sworn to and subscribed before me this 24th day of September, 1937. Sylvia Rubenstein. (My commission expires January 26, 1939.)

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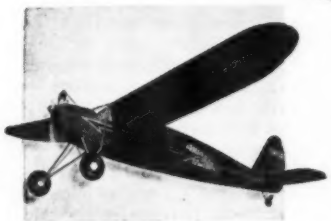
ASK YOUR DEALER FOR THESE GAS MODELS, or SEND YOUR ORDER DIRECT. SATISFACTION GUARANTEED.



MISS AMERICA—7 Ft.

AGAIN TAKES FIRST PLACE

at Kresge's fourth semi-annual Gas Model Meet, held October 16, 1937. L. E. Tench of 238 Philadelphia Ave., West Pittston, Pa., won First Prize with his MISS AMERICA model. His time was 15 min. 39 sec. and more than 175 contestants completely

This model is a reliable, consistent performer and has won repeatedly in gas model meets in all parts of the country. Kit is complete in every item required including 3½ in. Pneumatic Rubber Wheels and finished Hardwood gas model Prop. A dependable flyer for general sport or contest flying. Ask your dealer or send your order direct. Complete Kit.....

$9.50 Postpaid Less Motor

Biggest Kit Value Ever Offered In the Gas Model Field

RED ZEPHYR

Wing span 72 in. Length 56 in. Weight (less motor) 2½ lbs.

This model holds the Championship of France and on September 11, 1937, won twice at the Quaker City Gas Model Meet. The most complete, perfect, and easy to build model ever offered at this amazing low price. Full shock-absorbing landing gear with brackets, vibration absorbing motor mount. Kit includes 3½ in. PNEUMATIC RUBBER WHEELS and all parts and materials required to build entire model, including 2 large sheets of full size plans with instructions, photographs, diagrams, and detailed illustrations. This is an efficient and beautiful Model and offers the greatest value on the market. Ask your dealer to show you the RED ZEPHYR. Complete Kit.....

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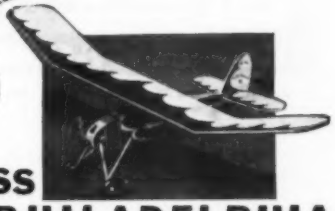

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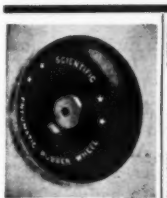

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Small size, weight 2¼ oz. Adjustment 0 to 130 sec. Silver contact points, vibration proof, accurate. Easily mounted in any position. Each **$3.00**

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Sides, front, and hinged top. Air vents stamped in sides and front. Easily built into any gas model. Complete set.....**$1.00**

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5 ft. Long

⅛x⅛	.....$.02
⅛x¼	.....$.04
⅛x⅜	.....$.06
⅛x½	.....$.06
3/16 sq.	.....$.04
3/16x½	.....$.08
¼x¼	.....$.06
¼x⅜	.....$.08
¼x½	.....$.10
¼x⅝	.....$.10
½x½	.....$.12
½x¾	.....$.15

SHEET BALSA
5 ft. Long

1/32x2	.....$.10
1/32x3	.....$.15
1/16x2	.....$.12
1/16x3	.....$.18
⅛x2	.....$.15
⅛x3	.....$.20
3/16x2	.....$.16
3/16x3	.....$.25
¼x2	.....$.20
¼x3	.....$.25
½x2	.....$.25
½x3	.....$.35

TRU-PITCH GAS MODEL PROPS
Accurately carved with hole drilled. Made of clear, hard wood in 13 and 14 in. sizes. Look for the name "SCIENTIFIC TRU-PITCH" stamped on every prop. Each....**$.90c**

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Most beautiful props obtainable: finished with 8 coats Buick Metallic Gray Auto Enamel, hand polished to a Hi-gloss finish. 13-14 in. Each **$1.75**

Use this coil for new pep and power in your engine. Each....**$2.50**

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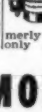

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The finest spark plug made. Formerly $1.50, now only **$1.00**

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Each .....**$.65**

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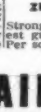
Fit all above spark plugs. Each 5c—6 for **25c.**



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Slightly heavier than preceding, but twice as strong. Per sq. yd. **75c**

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Complete set of 2 brackets and 6 set screws. Complete **50c**

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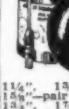

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6 sizes.....**25c**

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With Filter.....**30c**

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Strong, durable, fresh.
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⅛"x⅛" per ft.....**15c**
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⅛" O.D. ft.....**10c**
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.003" sq. ft.	.....15c
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No. 1 size.....**89c**
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3 oz. bottle.....**$ .25**
½ pt. can.....**.50**
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1 qt. can.....**1.40**

HOOK UP WIRE
Oil, gas and waterproof, 5 ft. coil **30c**

DO-NUT RUBBER TAIL WHEELS
1" diam. ea. **8c**
1¼" diam. ea. **9c**
1⅝" diam. ea. **10c**

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JAPANESE TISSUE
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JAP-FIBRE paper superior to silk for GASOLINE POWERED MODELS. Weight and strength properly proportioned. Natural shade. Handmade.

Recommended by all leading firms and also by builders of record-breaking gas models.

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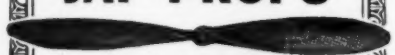

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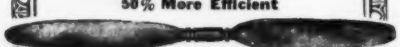
BROAD BLADE
50% More Efficient



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BRASS PROPELLER SHAFTS

MINIATURE CELLULOID MOTORS

4 sizes: 1½"; 2"; 2½"; 3"

Another Japanese Import

These lightweight motors have been designed to our specifications. Every detail of the original radial engine has been accurately reproduced even to the cowl plate at the front. They are a distinct improvement over any other dummy motor. At Whitfield's low price, they can be easily included in every flying model kit.

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ish national records, let us look at the types of model used.

From the beginning there has been a strong influence from our southern neighbour, Germany. We knew that the official German model-drawings were O. K. If these models would not fly it was due to ourselves. The Klasing series consisting of three gliding models, the "Knirps" (about two feet 5 inches span), the "Baby" (about 3'10") and the high-performance plane "Strolch" (about 6' roughly, have been our "Standard" models. They are simple and strong, built up of spruce and plywood and covered with Japan tissue paper or Indian mull.

Other German gliding models, such as the well-known "Grosse Winkler" and the "Gentsch" have been built and flown too.

Motor-models were not seen often in the beginning. A few German models, quite great, built up like the gliders but lighter, were casually seen, but did not reach great results. Then Denmark got a special model airplane manufactory. This firm "Model Materiale" has been influenced by the Swedish types which chiefly are light caoutchouc-motored models, built of balsa. Most of these excellent Danish constructions can be traced back to well-known Swedish models, but some of them have been improved. The smallest of them, which most inappropriately bears the name "Ornen" (The eagle), is a very near relation of the well-known Swedish "Tummeliten". Among the newest production types are the "Gloria", a light model of about 3'4". It is built of balsa longerons and balsa ribs, and covered with thin Japan tissue paper.

Scale models are rather seldom here. We have seen some non-flying ones, but the flying scale models, which are so popular in the United States, are very little used. We firstly want a model to fly. It is of less importance, if it looks like a real aeroplane or not. We have seen a single, a Fairchild 22, which won great admiration at our latest exhibition. Incidentally it won the Bendt Rom Prize. This is a little cup, presented by Mr. Bendt Rom, who got it himself about 25 years ago for fine accomplishment of a flying model. It is now an eternally wandering prize given for the finest work.

The American indoor ultra-light models are quite unknown and not used here. Petrol models have not flown in this country yet, as far as I know. A little gas-motor, bought in Germany, was exhibited in Odense this winter.

We also hear from W. G. Alexander of Auckland C.1, Box 1662, who is secretary of the New Zealand Model Aeroplane Association. He sends us news of this club's activities. This organization is one of the most active in New Zealand and they have promised to send us regular news of their activities.

Some very interesting comments on the comparison of British and American airplanes come to us from Gordon S. Smith of Brougham Street, New Zealand. He says:

"From my comparison of planes England leads slightly with the small craft such as the fighters but in the transport planes they are miles behind. On the whole, America leads.

"In Australia, as well as in New Zealand, both governments did not allow any foreign planes to compete with the British. In Australia every DeHavilland passenger transport crashed or fell to pieces flying under normal flying conditions until there was such a loss of life that the government lifted the ban on foreign machines. When this was done DeHavilland said that 'If Australia wants planes, DeHavilland can build them.' In the very same paper as this report appeared was a further one cancelling ALL flights on DeHavilland machines in Australia. They are now allowed to fly mails only.

"Since Douglases and Stinsons have been in use the airways have gone ahead, even the Prime Minister travelling from Tasmania now used the air, when before he always went by water transport. Admittedly, two Stinsons have crashed, but these both went in a bad storm, when if the DeHavillands had been still runinng they would not have lifted off the ground.

"I also remember that during the Centenary Air Race that a Douglas piloted by the two Dutchmen, Parmentier and Moll, landed in a back yard airport at Albany with mud over their axles. The Aussies used to English machines said that they could not even land, let alone take off—they did both, which has not even been attempted since in an English machine of the same proportions.

"In New Zealand the government now is allowing foreign planes and several Lockheeds and Stinsons have been ordered. Many airways were planned but until the ban on foreign planes was lifted only one service bought English. Supposed to carry 14 passengers and freight, they can only carry about 7. These continually are taking away fences, and in wet weather have to be put to bed, so as to speak, because they might get cold feet.

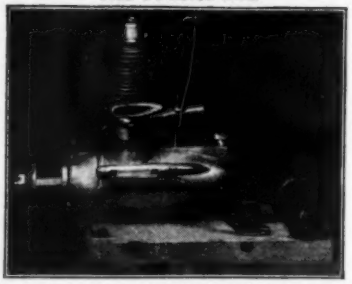
"This fact that two of England's most loyal children, who once barred foreign planes, having lifted that ban, speaks not too well of English planes but speaks highly of the American. No English flying boat can compare with the American either, just compare their activities, results, etc."

It is interesting to hear a native of the British empire give credit to "foreign" planes.

(Continued on page 40)

MODEL AIRPLANE ENGINE

THE SYNCRO ACE



is the first modern, streamlined gasoline engine designed for model airplanes. Each engine is block tested at factory. Equipped with new, high efficiency coil, developed by Delco-Remy, oilite bearings and new, high efficiency Champion spark plugs. Develops ⅛ H.P. Bore, ⅞"; stroke 15/16"; speeds from 800 to 8000 R.P.M. Special matched steel piston; special alloy connecting rod; counterbalanced crankshaft. Improved timer.

Each engine factory tested, mounted on skids and sold ready to run. (Less batteries.)

Only $15.00, from your dealer. Write for illustrated folder and full information.

SYNCRO DEVICES, INC.

823 Boydell Bldg. Detroit, Mich.

Ready For Christmas!

Sensational New

MEGOW MODELS!

Approved by Al Williams

Al Williams GULFHAWK

An easy-to-build model kit of the famous Grumman, duplicating the latest navy fighting plane, plus new features by Major Williams.

50c *plus 10c postage.*

MISS STRATOSPHERE

Approved by Clarence D. Chamberlin

Exact ½-in. scale model kit of Col. Chamberlain's high altitude ship, introducing a new type of construction using wood veneer.

60c *plus 10c postage.*

QUAKER FLASH

$4.95 Postage 30c ea.

Outstanding among all gas-powered models. Uses any model airplane motor. Large, but folds to carry in car. 3¼ in. rubber wheels. Wingspan 67 in. Length 47 in.

"GULL WING" STINSON RELIANT

Exact in outline scale and external details. Designed chiefly for flying. 30 in. wingspan.

50c *plus 10c postage.*

MONOCOUPE 90A

Exact outline scale model of a much-liked two-place sport plane. Very stable flier. 30 in. wingspan.

50c *plus 10c postage.*

AERONCA K

A new development of the famous Aeronca C3. In place of old wire bracing, wing struts are now used. 30 in. wingspan.

50c *plus 10c postage.*

SHIP MODELS

The new Megow catalog contains dozens of fascinating ship models, comprising almost every type from ancient galleons to the modern QUEEN MARY. The historic "BOUNTY" shown here.

$1.25 *plus 15c postage.*

ARROW SPORT V-8

Authentic detail model of an outstanding Ford V-8 powered sport plane. 30 in. wingspan.

50c *plus 10c postage.*

MEGOW'S

Dept. MA., Howard & Oxford Sts.
Philadelphia, Pa.

Chicago: Dept. MA., 217 N. Desplaines St.

Every model builder—and that includes about every young man and boy—gets his greatest Christmas thrill from a really top-notch model airplane or boat. With many indoor days and long evenings ahead, the Christmas season is the best time to start work on the big flying or scale detail model you have dreamed about. Either for yourself or as a gift, a Megow model will bring the greatest pleasure of all.

During the last few months many wonderful new designs have been added to the Megow line . . . big fellows, beautiful flying and detail scale models . . . some sponsored by the world's greatest aviators such as Colonel Clarence Chamberlain and Major Al Williams . . . gas-powered models, also . . . and all are shown in the new 54-page Megow catalog now ready for you.

Make your selections right from this page, or ask your dealer to show you these latest models. Or, send for the new catalog just off the press. It's a picture-guide to all the well-known planes. Send 5c for your copy today.

Any of the models shown here will be mailed upon receipt of price with postage.

Use This Coupon!

MEGOW'S
Dept. MA., Howard & Oxford Sts.,
Philadelphia, Pa.

Please send me

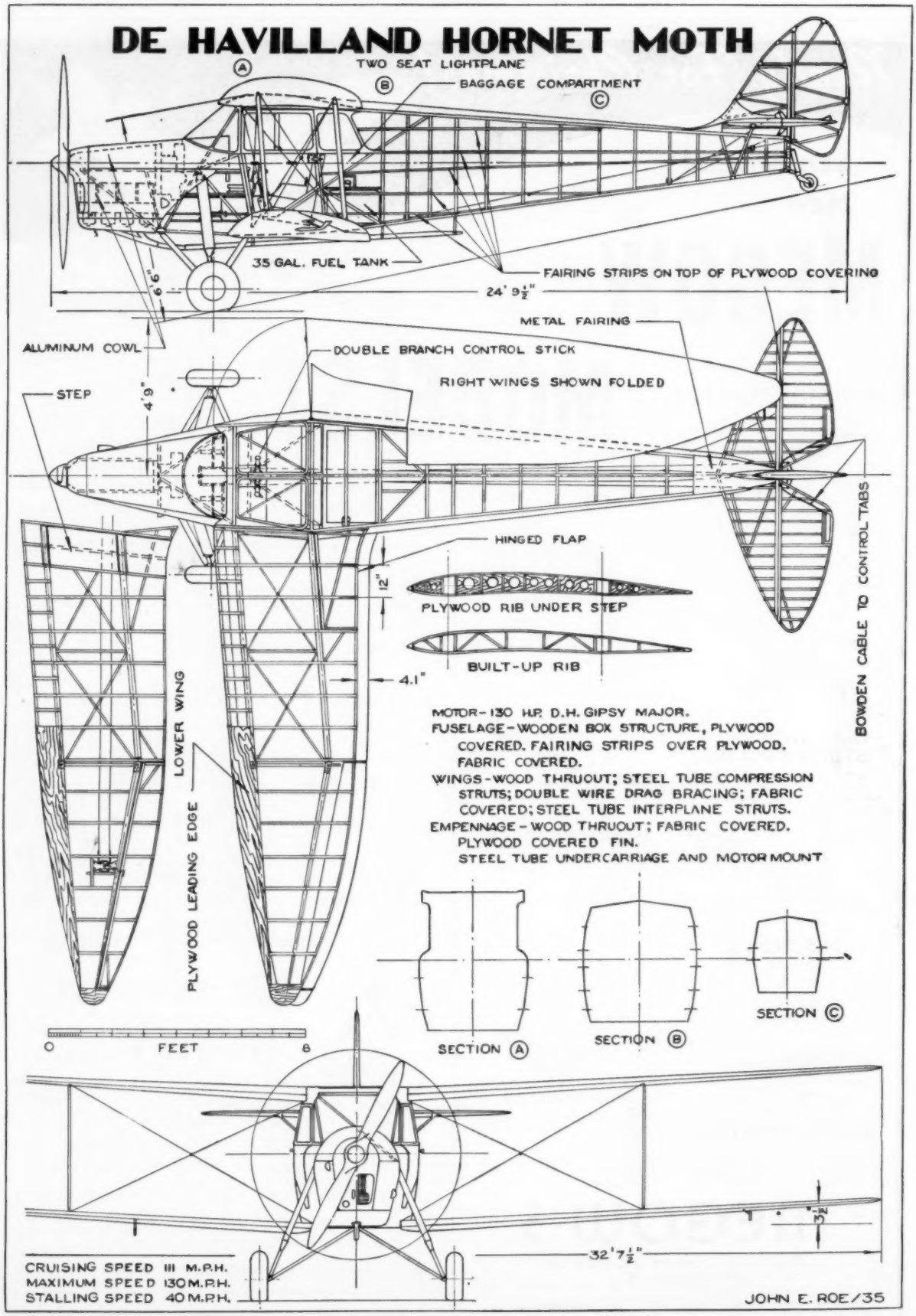
( ) GULFHAWK
( ) MONOCOUPE
( ) AERONCA K
( ) ARROW SPORT V-8
( ) QUAKER FLASH
( ) MISS STRATOSPHERE
( ) STINSON RELIANT

Money order for..... is enclosed.
( ) If you want a catalog, enclose 5c and check here.

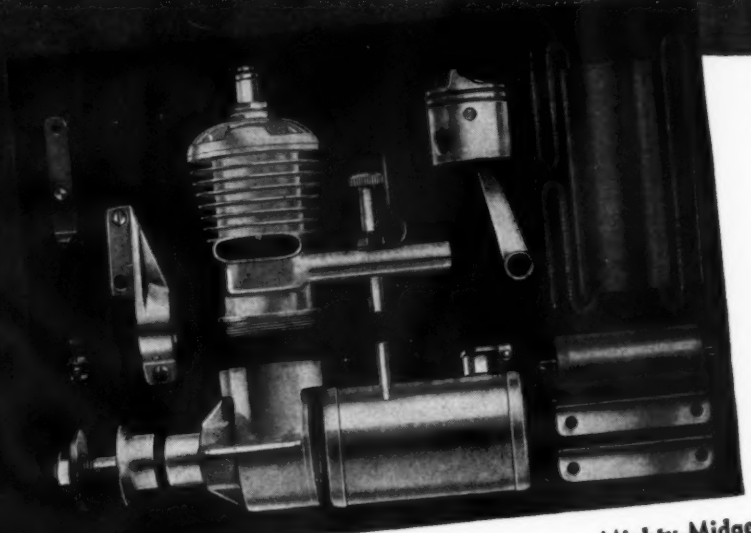
Name .....

Address .....

City ..... State .....


DE HAVILLAND HORNET MOTH
TWO SEAT LIGHTPLANE
BAGGAGE COMPARTMENT
35 GAL. FUEL TANK
FAIRING STRIPS ON TOP OF PLYWOOD COVERING
24' 9½"
6'6"
METAL FAIRING
ALUMINUM COWL
DOUBLE BRANCH CONTROL STICK
RIGHT WINGS SHOWN FOLDED
STEP
4'9"
HINGED FLAP
12"
PLYWOOD RIB UNDER STEP
BUILT-UP RIB
4.1"
BOWDEN CABLE TO CONTROL TABS
LOWER WING
PLYWOOD LEADING EDGE
MOTOR - 130 H.P. D.H. GIPSY MAJOR.
FUSELAGE - WOODEN BOX STRUCTURE, PLYWOOD COVERED. FAIRING STRIPS OVER PLYWOOD. FABRIC COVERED.
WINGS - WOOD THRUOUT; STEEL TUBE COMPRESSION STRUTS; DOUBLE WIRE DRAG BRACING; FABRIC COVERED; STEEL TUBE INTERPLANE STRUTS.
EMPENNAGE - WOOD THRUOUT; FABRIC COVERED. PLYWOOD COVERED FIN.
STEEL TUBE UNDERCARRIAGE AND MOTOR MOUNT
SECTION (A)
SECTION (B)
SECTION (C)
0
FEET
8
32'7½"
CRUISING SPEED 111 M.P.H.
MAXIMUM SPEED 130 M.P.H.
STALLING SPEED 40 M.P.H.
JOHN E. ROE/35

Thousands BUILD MOTORS FROM MIGHTY-MIDGET *and* GWIN-AERO KITS



- **The world's most powerful, lightweight, modern engines for their displacement.**
- **Every part is machine-finished and fitted to close limits.**
- **Final assembly with ordinary model builders' tools takes but an hour—saves ½ to 1/3 finished engine price.**

NCA GWIN-AERO
Upright Kit $11.35
Inverted Kit 11.60

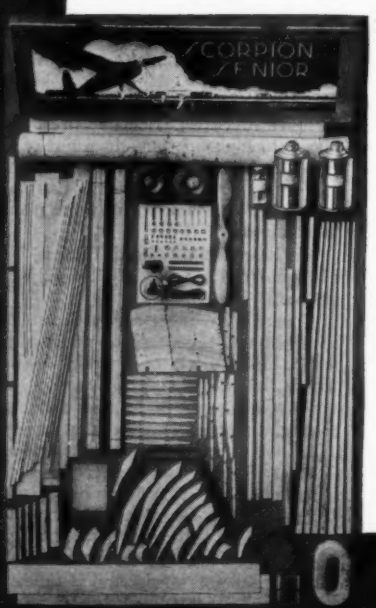
Piston Rings and **Hi-Dome** Piston.

NCA MIGHTY-MIDGET
Upright Kit . . . . . $ 9.85
Inverted Kit 10.10

Anyone Can Assemble the Gwin-Aero or Mighty-Midget

If you can handle a screw driver, crescent wrench and pointed-nose pliers you are qualified to do a first-class assembly job. The new Model N C A Gwin-Aero and Mighty-Midget Kits are now a cinch to set up. **This is what you do:** Screw in six head bolts. . . . Screw cylinder into crankcase. . . . Mount timer spring, points, carburetor, each with a single nut. . . . Solder ends and fittings to tank. . . . Then screw finished motor to furnished mounting skids and your **GWIN-AERO** or **MIGHTY-MIDGET** is ready to run. Keep the cost of final assembly yourself. Order a Gwin-Aero or Mighty-Midget Kit today. We guarantee 24-hour delivery service so you can get started immediately. Send Postal Money Order. Prices Post Paid.

BUNCH SCORPION GAS MODELS



Scorpion Senior as built from kit.

Scorpion gas models out-fly and out-class **all** gas models. Wt., 3 lbs. Wing, 57 inches. Length, 41 inches.

MASTER KIT—Contains plans, instructions, all finished and shaped parts as illustrated. Includes "Autoknips" duration timer, 3½-in. pneumatic wheels, shaped balsa cowling, full pint regular cement and 1 pint dope. Also switches, terminals, ignition wiring and all fittings to install motor and prepare model for flight. Postpaid, **$10.50**

STANDARD KIT—Same as Master Kit, less carved prop, timer, wheels, ignition wiring, terminals and switches. Postpaid **$6.95**

SPECIAL KIT—Same as Standard Kit, less cement and dope. Motor cowl blocks instead of shaped cowling. Postpaid **$4.95**

PLANS AND INSTRUCTIONS only—postpaid . **50c**

***Now!* Assembled Mighty-Midget**

COMPLETELY FINISHED MODEL NCA MIGHTY-MIDGET RACING ENGINE; block-tested and ready to run on mounting skids. **PISTON-RING EQUIPPED.** Packed in strong case. Bore, ⅞ inches; stroke 13/16 inches. Weight, bare, 6½ ounces. 1/5 h.p. at 5200 R.P.M., ¼ h.p. at 8500 R.P.M. Order direct from factory or from your dealer. Postpaid, **$14.00**

BUNCH MODEL AIRPLANE CO.

5009 South Hoover Street . . . Los Angeles, California

British Agents: Model Supply Stores. Sales Depot and Showroom, 4 Stewart St., Deansgate, Manchester, 3.

$35 Once—Now $8.50
OVER 6000 IN USE

Many model builders are not aware of the fact that the G. H. Q. gas engine once sold for $35 each and the demand was so great that there was a waiting list of customers. Mass production methods and enthusiastic customer reception have enabled us to lower our price, postpaid, to $8.50 for a finished parts set and $12.50 for the completely assembled motor.

4 Port 2 Stroke cycle—¾" Stroke—15/16" Bore—300-12,000 R.P.M. Weight, 12 oz. (Motor)—Turns 14" Prop. 8" Pitch—Bearing Surfaces, ¾" x1¼" — Crankshaft, 5/16" Diam.—Rotation, Either Direction.

One Day Service

Flies model planes up to 10 foot wingspread; also used for boats, etc.

An engineering triumph accomplished after years of research. No oil, gas or batteries included. A finished flywheel mounted on every assembled motor.

Every G.H.Q. motor is given a gruelling test and run before being shipped to you. We have spared no expense in modern factory production so that we may be certain that each G.H.Q. motor conforms to its high standard of performance. Read the guarantee below—can anything be fairer?

The G.H.Q. motor is priced especially low because of our tremendous output and because you deal direct with our factory. This famous motor, completely assembled on stand, tested and run before shipment, performance guaranteed, together with free fly-wheel, finished and mounted, postpaid for only..... $12.50

Build Your Own Engine-SAVE $4.00

Here is your opportunity to obtain a kit of the famous G.H.Q. Motor. Assemble it easily yourself—no special tools required—and save almost one-third. All parts used in the finished G.H.Q. Gas Motor are included in this kit, including plug, coil, condenser, tank, ignition wire, cylinder, piston, connecting rod, timer, crankshaft, all screws, nuts, bolts, etc., etc. No gas, oil, batteries or propeller included. Postpaid only $8.50

WARRANTY—GIVEN ONLY BY G.H.Q.

"We warrant each new G.H.Q. gasoline engine manufactured by us, to be free from defects in material and workmanship under normal use and service, our obligation under this warranty being limited to making good at our factory, any part or parts thereof, which shall, within ten (10) days after delivery of such motor to the original purchaser, be returned to us with transportation charges prepaid, and which our examination shall disclose to our satisfaction, to have been thus defective; this warranty being expressly in lieu of all other warranties expressed or implied and of all other obligations or liabilities on our part, and we neither assume nor authorize any other person to assume for us any other liability in connection with the sale of our G.H.Q. gasoline engine."

G. H. Q. MODEL AIRPLANE COMPANY
854M East 149th Street,
New York, N. Y.

Please send me, postpaid
.....G.H.Q. Finished Parts Set for $8.50

.....G.H.Q. Finished Assembled Motor, with finished flywheel for $12.50.

I enclose payment.

.....

.....

.....

G. H. Q. MODEL AIRPLANE CO.
854M East 149 St., New York, N. Y.

(Continued from page 36)

CLUB NEWS

California

We hear from Waldemar E. Doyal, director of the model contest held in connection with the California State Fair, who sends us picture No. 13. It shows Louis Shock in the act of launching his flying scale model. Mr. Doyal says that this young man has been a winner of the flying scale model event at the State Fair Contest for three years. Two years ago he was awarded a scholarship to the Boeing School of Aeronautics for his fine work with this type of model. He is now working at an airplane factory in Los Angeles.

Illinois

It appears that Mr. Edmund B. Swort of 102 West 72 Street, Chicago, Illinois, is very much worried about the fact that we gave the time of Turner's glider flight as 2 minutes, 32 seconds indoors. He calls our attention to this mistake. Actually this was an outdoor glider flight. He says that it is true, however, that Turner attained the remarkable time of 4 minutes, 22 seconds official with his ornithopther indoors.

He also calls the attention of model builders to the fact that the Chicago Aeronuts and the Gas Model Aeronauts of Chicago are not the same club. The latter is a recently organized group of gas model builders with no relation whatsoever to the Chicago Aeronuts. He sends the following news from the Aeronuts:

"The boys from Chicago are once more at the top of the list for national records, thanks to Milt Huguelet for the Jr. R.O.G. record and Wally Simmers for coming through in the Nationals with the Class B Indoor Stick. His 21:30 is the highest time that ever won the Stout Indoor Trophy and is a new Class B record.

"President Carl Goldberg is hearing a lot of 'I told you so' since his neglect of indoor practice, due to his gas buggy, caused him to be satisfied with only second place indoors. He had captured the Springfield Trophy three times in succession before this. His second place in the gas event, however, may be a consolation.

"Milt Huguelet didn't do so badly in consideration of it being his first Nationals. The Saturday before the brawl he set a new Jr. Baby R.O.G. record in Chicago, then went to Detroit and placed third in Indoor Stick, and fourth in Indoor Fuselage. The same week Milt set a new Chicago record of nineteen minutes for the armory here.

"The 'nuts' all enjoyed their stay in Detroit and gained the experience of going through one more National meet. We all join in the old timeworn cry, "Wait till next year!!""

New York

The New York State Fair Outdoor Model Airplane Meet, sponsored by the Syracuse Model Airplane Club and Exchange Club of Syracuse, was held on Sunday, September 5th, at Syracuse Airport. We await news of this contest with interest. At the time of publication the results were not obtainable.

Wisconsin

Walter Erbach of 1927 North 7 Street, Sheboygan, Wisconsin, writes:

"Here is a little news about a seldom heard of portion of the country, central-eastern Wisconsin. Sheboygan has a very active club called 'Sheboygan Air Screws,' consisting of two members. It was organized the last week of May, 1936. Since then its members (Walter Erbach and Curtis Janke of 908 Michigan Avenue) have attended five contests, only one of which was less than 110 miles away. The members have taken ten prizes, including one grand prize, three firsts and three seconds.

"The members have experimented with all types of models except gas jobs. They have even flown gliders with a fish pole, in the manner of fly casting, using the glider in place of the fly.

"Mr. Janke has the honor of being among the first to report an out of sight thermal flight under the new weight rules. The flight, which was made June 10th, about 4:30 P.M., was done with an all-balsa stick model. It had a 36" 100 square inch wing on a 36" motor stick with no tail boom. The complete job weighed 3.28 ounces and was powered with 16 strands ⅛" MRL on a 16" prop. The ship rose up steeply and disappeared from view after five minutes. Of course, there was no name or address on the ship. This seems to be the best trick to get ships out of sight."

NOTICES

Mr. Norman E. Thomas of 2203 14 Avenue North, Birmingham, Alabama, puts in a call for a chance to jump in a parachute. He wants to know if permission is required from the Department of Commerce and how he can get a chance to try a "suicide leap." Possibly some of our readers can answer this question for him.

Here we have a little boost for MODEL AIRPLANE NEWS. Mr. James Nankervis of Rough & Ready, Calif., P.O. Box 13, says:

"My stepfather thinks this magazine is the best magazine he knows of for young fellows and wishes more magazines of this kind were published so young boys and men would have something worthwhile to think about."

Mr. Victorio L. M. Noguera of 1045 Montevideo Street, Buenos Aires, Argentine, is looking for some drawings of Wiley Post's training biplane, which machine he is very eager to construct. Can any of our readers tell him where these plans can be obtained?

We hear from Conrad Hansen, Jr., of Hangar No. 13, Y.M.C.A., Beloit, Wisconsin, as follows:

"I have in my possession a Class C Commercial found the afternoon of August 15th in the 1600 block of Prairie Avenue in North Beloit.

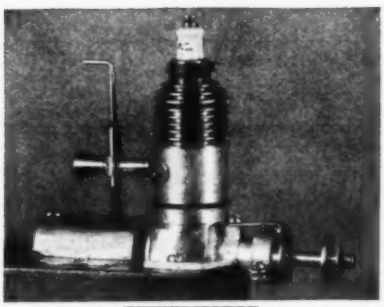
"This model no doubt flew away at the contest. Please send me the names and addresses of any fellows that you know of who lost their rubber-powered jobs. Probably the fellow from Kenosha or some of the gang from Chicago. The model does not belong to Rockford, Janesville, or Beloit, I'm sure. No name on it.

"One gas job was found 8 miles north of Beloit. No kidding!!"

The model builder who owns the model to which Mr. Hansen refers may obtain it

FROM GAS MODEL HEADQUARTERS—

FOR A REAL CHRISTMAS—ORDER NOW FROM JAY'S—

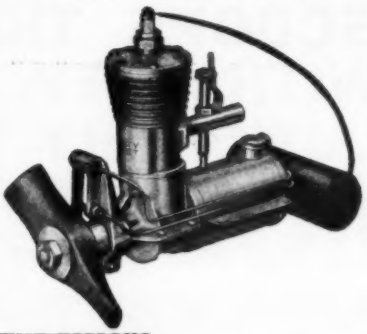


CHUNN MOTOR

HERE IS THE MOTOR FOR THAT SMALL GAS MODEL

This little motor flies 3 ft. to 5 ft. models weighing up to 2 lbs. 1/10 H. P. at 4500 R.P.M.—500 to 8,000 R.P.M. 5/8" bore 17/32" stroke, weight, bare, 3½ oz. Total weight of motor, coil, condenser, gas tank, 6 oz.

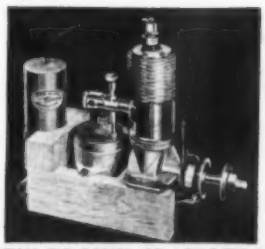
The CHUNN MOTOR is built to give you real service, is easy to start, and very reliable in performance. It is only 3 inches high, and the motor and tank will only take up 2½ inches. Your CHUNN MOTOR will be sent to you immediately complete with coil, condenser, gas tank and two propellers (furnished only by Jay's) for only **$17.50**



THE FAMOUS MIGHTY MIDGET MOTOR

Made entirely of finest steels and Aluminum alloys manufactured on best production equipment, with all parts precision fitted, to assure you of the utmost in performance. Power and compression sealed in with high-tension piston rings. "DUALINE" main bearing, coupled with positive action timer delivers all the power through the crankshaft. 7/8" bore—13/16" stroke—4½" overall height—full 1/5 H.P. at 5000 R.P.M.—Speed range with regular propeller, 500 to 7500 R.P.M. Order your MIGHTY-MIDGET MOTOR now, from JAY's, complete with coil, condenser, tank, completely run-in at the factory kith TWO FREE PROPELLERS (furnished only by Jay's) for only **$14.00**

Upright Model



NEW BROWN JR. MOTORS

The new C-model BROWN JR. MOTOR with aluminum piston and rings, and new fool-proof needle-valve which makes it start more easily and stays adjusted better. The new C-MODEL BROWN JR. comes to you complete ready to mount in your model, with 2 FREE PROPELLERS (furnished only by Jay's) for only **$17.00**

FAMOUS B-MODEL BROWN JR. WITH NEW TANK, ETC. $21.50

WE STOCK THE FOLLOWING MOTORS FOR IMMEDIATE DELIVERY:

New C-Model Brown Jr.	$17.00
1937 Mighty Midget Motor	14.00
1937 Inverted Mighty Midget	17.25
1937 Gwin Aero, Inverted	18.25
Finned Head	17.50
1937 Gwin Aero, Inverted	18.25
1937 (B-Model) Brown Jr. Motor	21.50
1937 Ohlsson Motor	18.50
Trojan Jr.—½ h.p.	18.50
Husky Jr. Motor—for 1 to 3 lb. Models	12.50

MOTOR KITS

1937 Mighty Midget Motor Kit	$ 9.85
1937 Mighty Midget Kit—Inverted	10.10
1937 Gwin Aero Motor Kit	11.35
1937 Gwin Aero Kit—Inverted	11.60

Remember—You get a Handy Model-Makers' Knife Free With Every Motor Kit!

SILVER FLYER

THE SILVER FLYER is a trim stable flyer that will thrill you with its performance. 6 ft. span, 3½ ft. long. The kit is complete with finest quality balsa cut to size, cement, dopes, wing-ribs, formers, etc., printed, balloon balsa wheels, all metal parts needed, complete full-size plans and instructions. Shockproof landing gear, demountable wings, adjustable tail surfaces, etc., are only a few of the many fine features of this complete kit, which makes a sure flyer. Construction is very simple and rugged, making the ship easy to build and hard to crack up. Complete kit only..... **$6.50**

Plus 50c Shipping

Kit with 3½" airwheels $7.75 plus 50c shipping

GAS MODEL PROPELLERS

FINEST MADE HARDWOOD PROPELLERS—9", 10", 12", 13", 14"—50c ea.—3 for $1.25

SYNCRO-ACE MOTOR

New streamline SYNCRO-ACE MOTOR—Designed by leading aero-dynamics engineer for long life and easy starting. HORSEPOWER—¼—500 to 10,000 R.P.M., BORE—7/8". STROKE—15/16". PISTON—Special Ray-Day Alum. alloy. CONNECTING ROD—Special cast Alum. alloy. CYLINDER—Machined of steel to within .0001 inch. CRANKSHAFT—Counterbalanced, special steel. TIMER—Improved steel and fiber construction, placed well above grime and dirt. IGNITION COIL—Special light-weight, Delco-Remy. SPARK PLUG—A.C.—ALL PARTS INTERCHANGEABLE due to special precision manufacture. SYNCRO-ACE MOTOR. FACTORY TESTED, READY TO RUN, COMPLETE WITH COIL, CONDENSER, AND TWO ACCURATE PROPELLERS (furnished only by Jay's), ONLY **$15.00**

FAIRCHILD DE LUXE RANGER GAS MODEL

Span—6' 8¾", Chord—12 9/16", Length—58"

Weight ready to fly—3 lbs. 10 oz.

Approved by FAIRCHILD AIRCRAFT CORP.

Here is a model with clean racy lines which makes an excellent, stable flyer. This ship, due to its wing area, and excellent design, has an exceptionally good gliding angle. *All ribs, formers, etc., are cut to shape.* Kit comes to you complete with: all liquids, full-size blueprints, sheet aluminum, switch, screws, bolts, *formed motor mounts*, and many other parts too numerous to mention. This outstanding kit, complete with airwheels is only..... **$10.00**

Plus 75c shipping

ONLY JAY'S GIVES YOU 2 PROPS WITH EVERY MOTOR! (ASSEMBLED MOTORS ONLY)

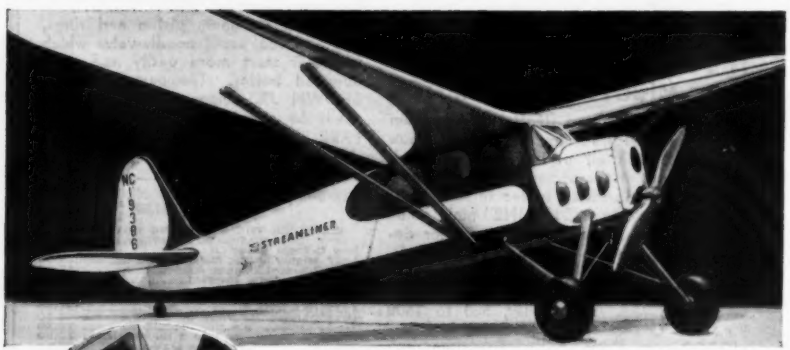
Send 3c Stamp for Gas Model Catalogue—California Buyers—Please Add Sales Tax!

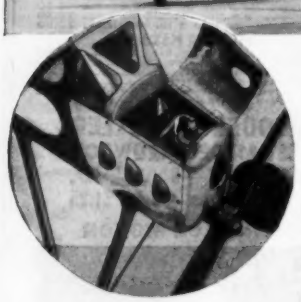
JAY'S MODEL SHOP

7763 MELROSE AVE. (Dept. M-16) LOS ANGELES, CALIF.

FLASH!

SCIENTIFIC SCOOPS THE INDUSTRY WITH A NEW AND REVOLUTIONARY GAS MODEL!





THE STREAMLINER

Designed by America's Gas Model Champion

MAXWELL BASSETT

and that means Perfection Plus!

6 ft. WINGSPAN LENGTH 43 in.

WEIGHT (less motor) 2¼ lbs.

Gliding Angle: App. 20 to 1. Climb: App. 200 ft. per min.

AFTER many months of hard work we have developed this gas model remarkably true to scale and still retaining the "Contest Model Performance," so vital in any gas model.

This model flies and does a real job of it! It has proven itself in numerous flights. The "Streamliner" is correct in aerodynamic design and perfect in structure. Super-construction makes the "Streamliner" practically crashproof. Designed by America's Gas Model Champion and developed under his personal supervision. When you build your "Streamliner" you can feel sure you have the latest and finest performing gas model that it is possible to produce. Send today for your "Streamliner" or ask your dealer to show you this remarkable kit.

STAMPED METAL NOSE COWLING

Includes sides, front, and hatch; air vents formed in sides and with brass hinges for hatch. Gives your model that big-plane appearance and beautiful lines.

FLEXIBLE WING MOUNTING

Should end of wing hit any obstacle on landing, the wing has sufficient "give" through the use of shear-off pins on the struts to withstand all shock. Model can be flown with or without struts.

CRASHPROOF LANDING GEAR

Landing gear is attached to fuselage with small bolts which allow it to pivot. Should landing gear become twisted in an exceptionally hard landing, it can be easily straightened again as all parts are movable.

HIGH WING STABILITY

High wing mounting and correct dihedral give this model unusual stability—as much as 60% more than the average model. Beautifully designed. High set dihedral wing with struts add grace and beauty to the model. Nose of model cowled, with big-plane lines and appearance through use of air vents stamped in metal sides and ventilating ports at front. Model is beautifully colored and decorated in red and white with black trim.

ADDITIONAL FEATURES

Detachable wing. Adjustable rudder control. Metal cowl hatch swings open on brass hinges (illustrated above) for easy access to engine.

COMPLETE KIT

Including All Items Listed Below

$4.95 Postpaid or at Your Dealer

Less Motor and Wheels

Kit includes printed balsa wood; selected strip balsa cut to correct lengths; liberal quantities of everything—nuts, bolts, hook-up wire, tough landing gear wire, washers, electrical connections, miniature wood screws, gas model cement; bamboo paper and colored tissue; celluloid; rubber—everything required to complete the model.

READY MADE BALSA RIBS WITH NOTCHES FOR SPARS

Metal sides with die-cut vents stamped in place; formed and die-cut metal cowl front; formed metal hatch with brass hinges; metal wing strut fittings; special hard wood for landing gear and parts needing added strength; do-nut balsa tail wheel; all required insignia, numerals, and lettering; drilled propeller blank; large full size detailed plans giving every bit of information needed for building and flying The "Streamliner," with photographs, diagrams, and instructions for installing any gasoline engine. An exceptional value in a gas model kit at this popular price.

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In England: W. & S. Norman, 46 Derby Rd., Kirkhams, Prestwich, Lancs.
In Australia: Swift Model Aircraft, 158 Adelaide St., Brisbane, Queensland.
In South Africa: Stratosphere Model Aircraft Supplies, P. O. Box 3348, Johannesburg.

by writing him at the above address. We wish to thank him very much indeed for cooperating in this fine manner.

We just received a bulletin which tells us that the International Air Show for 1938 will be held in Chicago at the International Amphitheatre from January 28th to February 6th, 1938. The official sanction for the show has been recently granted by the Aeronautical Chamber of Commerce of America, trade association for the aircraft industry.

Junior Aviator's Model Contest

One of the biggest scale model contests ever held has been announced by the Scripps-Howard Junior Aviator headquarters. $250 in cash prizes is the amount Major Al Williams, National Commander, announced he is awarding for the finest replica of his Grumman Gulfhawk.

You may build it of any kind of material you wish. It may be a solid or built up model. In fact, it may be made from a kit purchased from a model dealer. However, it must be constructed like the real ship the Major flies and all parts must be to scale.

It is not a flying model contest, nor is the model limited to any size. Builders will be allowed six full months to complete their entries. The contest closes March 31st, 1938. Full contest rules follow:

Eligibility: Every boy and girl, regardless of residence is eligible in this contest.

Dates: The contest opens today and closes Thursday, March 31st, 1938, allowing builders six full months to complete models.

Divisions: Contestants will be divided into three divisions. Those up to 14 years of age form Division No. 1; Division No. 2 is composed of those from 14 to 18 and those from 18 and over form Division No. 3. All ages will be determined as of Jan. 1, 1938.

Prizes: First prize in each division will be $50 in cash. Second in each division will be $25 in cash and third in each division will be $10 in cash.

Builder: Each contestant must be the owner and builder of his model.

Material: Entries may be built from any kind of material including cardboard, papier mache, metal, balsa wood, pine wood, etc. They may be constructed from kits or supplies and may be built-up or solid models. They do not have to fly but they must be built to scale.

Size: There is no limitation as to size. It may be as big or as little as the contestant wishes. Drawings need not accompany entries.

Purchased parts: Contestants may buy as many parts as they wish to complete their models. However, all purchased parts must be listed and tagged to entry. They will not be counted in the final scoring toward total points for workmanship and detail.

Scoring: Judges will score the final winners as follows: workmanship 50 points, fidelity to scale 25 points and detail 25 points.

Decision: The judges' decision will be final.

For further information write to Ed Clarke, National Director, Scripps-Howard Junior Aviator, The Press Bldg., Cleveland, Ohio.

Designing Your Gas Model

(Continued from page 25)

at the C.G.) and its tendency to push the plane sideways to the right. Thus this centrifugal action is greater in proportion to the airplane's size in gas models than in "rubber models."

Before we investigate the effect this state of affairs may have on the flight of an airplane, let us consider what other differences there may be between these two types. We know that a gas model flies faster than a rubber-powered plane. Thus in a turn of any definite degree, greater centrifugal force is generated in the gas model, for the intensity of this force is proportional to the square of the velocity, (V^2). A slight increase in the speed at which any plane flies, therefore causes a great increase in the centrifugal force acting on it and the intensity with which it pulls sideways on the plane.

Rubber-powered models are comparatively light and fly at an extremely low speed, as a rule. The centrifugal force generated therefore is practically negligible. Not so in gas models, for due to their greater weight and speed, the sideways pull of the centrifugal force has a pronounced effect on the plane. In fact this is the chief difference between the two types.

It is a significant fact in light of these conditions that a rubber-powered model can he designed without considering the effect of centrifugal force. This is exactly what model builders have been doing. No detrimental effects have been produced in the flight of such models because centrifugal force practically has not existed.

When turning to the design of gas models, rubber-power model fans naturally have followed the same procedure as in the design of rubber-powered ships. They have ignored the effect of centrifugal force generated by the greater weight (mass) and speed of their gas models.

As this is practically the only difference between the factors entering into the problem of rubber-powered planes and those important in the design of gas models, it is logical to assume that these are the mysterious missing factors that have baffled many gas plane designers; factors that have caused great instability in many planes, and consequent heartrending crashes.

Though the effect of centrifugal force is the cause of instability in many cases, obviously it does not produce undesirable qualities in all models. If so, no gas models would be able to fly with any degree of stability under all conditions. *The secret lies in locating the center of gravity at the proper point in relation to the other forces acting on the airplane.* In fact, centrifugal force in itself cannot cause instability, but only when acting in conjunction with other forces to produce unstable moments.

The problem resolves itself therefore into determining which force arrangements are stable and which are not, when centrifugal force is included in the analysis as one of the disturbing factors.

A force arrangement in order to be termed stable must endow the model with four general types of stability; lateral stability, longitudinal stability, directional stability and spiral stability. It is necessary to understand how to attain only the first three types in order to design suc-

Jim Clark's "FLEA"

FLIES 10,000 FEET FOR WORLD RECORD

We always knew this remarkable model was an exceptional flyer, so the following letter does not surprise us.

Dear Sirs: Akron, Ohio

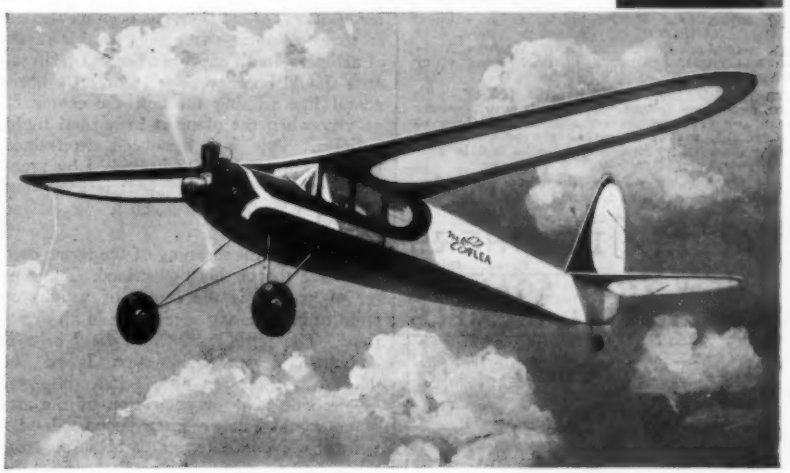
Your advertisement was all wrong about The Flea model flying ½ mile or 2,500 ft. because my Flea model flew for a distance of 2 miles or about 10,000 ft. I had launched the model after using a winder and it climbed like an elevator nosing up steeply but without stalling for a single second.

I thought the model would never come down, but it did eventually and after much running, I managed to be on hand when it landed.

A perfect flight if there ever was one. My models from now on will always be Scientific Flyers. I am enclosing a photo of my Flea model on another flight it made. To date I have flown my Flea model over 50 times without any damage or repair except for new rubber.

A Scientific Customer,

(Signed) James Clark.



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MOVABLE CONTROLS ON RUDDER AND ELEVATOR
SHOCK PROOF GAS MODEL TYPE LANDING GEAR
NEW TYPE BALL BEARING PROPELLER WASHER
SPECIAL BROWN CONTEST RUBBER
ADJUSTABLE WING WITH NEW TYPE CLIPS

Also includes a novel feature—the "Ratchet"—a device that creates a sound like the hum of a real gas motor as the model flies. All material for its construction is included in the kit and it is easily made. Wing is adjustable forward or backward to trim balance. Special clips are built into the under side of the wing to hold rubber strands which stretch around fuselage and hold wing in place.

The "FLEA" is exactly the model for enthusiastic builders who have been handicapped by the cost of a real gas powered model. It is the next best thing to a genuine Gas Model and is just the job for those desiring to gain experience before tackling the real thing.

The "FLEA" flies like a gas model—sounds like a gas model—but costs only $1.95. Read the contents of the kit in the next column and send your order now for this sensational flying model. The biggest money's worth you ever saw for only $1.95. Order your kit now.

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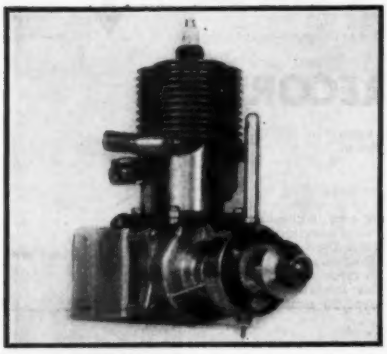

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Same as above with six inch machined barrel..... 1.90

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cessful rubber-powered models of light weight. However the fourth type, spiral stability, must be present in all heavy models with speeds over ten or twelve miles per hour. It is the correct use of the factor of centrifugal force that may make such a plane stable or unstable spirally, and is therefore the dominant consideration in gas model design. In every other respect a gas model may be designed according to the principles customarily used in the design of rubber-powered models.

Unquestionably readers are now wondering what arrangement of forces should be used in order that the action of the centrifugal force generated will produce stability. *The secret lies in the correct location of the center of gravity* (center of weight or balance of the airplane) *relative to the center of lateral area* which has been mentioned so many times in past pages of this series of articles. In all cases the center of lateral area should be very close to or on a horizontal line passing through the center of gravity when the plane is in normal flight position. This fact has been determined by scientific analysis and checked by practical experiment. However, it is important to know why this is true, so let us analyze the problem.

First of all the meaning of the terms used should be thoroughly understood. The center of gravity is the center of weight or point of balance of the airplane in all directions. The term *center of lateral area* is ambiguous to many, however. It may be defined as the point at which a silhouette of the side view or projection of the airplane would balance when supported on a pointed object. It may also be termed the center of pressure of the air that strikes the plane on its side or the center of pressure of the air on the vertical (side) projection of the airplane. To determine this point mathematically is a very intricate task beyond the scope of this article. It may be determined experimentally, however, in a very simple manner (see page 39, October, 1936, issue of MODEL AIRPLANE NEWS).

This is done by first cutting out of cardboard an accurate silhouette outline of the side elevation of the whole airplane, then locating the point at which this "shadow" outline balances in a horizontal position. If this point does not prove to be in the desired location, the side view outline of the plane must be changed in order to have the C.L.A. located properly. This may be accomplished by changing the outline and testing it until it is correct.

Now we are in a position to visualize what happens when the gas model makes a turn to the right or left when it is in flight. First, it is known that a force is generated due to centrifugal action, that acts on the plane horizontally sideways at the center of gravity. This force is represented by the arrow (C) in Fig. No. 128. In a turn it pulls the model sideways away from the direction of turn (and bank) unless another force exists that balances its effect. Actually the plane when turning moves slightly in a sideways direction. This causes the air to press against the airplane from the side. The horizontal pressure of this air against the side of the plane is exactly the same in intensity, but opposite in direction, to the centrifugal force (C). This force is the resultant of all the side pressures and acts at the center of pressure of the air on the vertical projection of the airplane, or, in other words, at the center of lateral area. In Fig. No. 128, (P) indicates the direction of the side pressure, and (C.L.A.) the point at which it acts on the airplane. In the case illustrated in this diagram, the *Center of Gravity* and the (C.L.A.) are not in the same horizontal plane. The (C.L.A.) is located quite a distance above the (C.G.). This is an actual condition present in the design of many gas models and typical of those with large dihedral. It is ironical that model builders insure excessive lateral stability by the use of large dihedral but thereby destroy the stability of their ships in a spiral sense, because the (C.L.A.) is raised by this feature.

It is evident from a study of Fig. No. 128 that an upsetting "couple" of forces (C and P) is generated, for this combination tends to throw the plane into a bank (to the right in the figure). The banking of the plane causes it to turn more sharply, which thus increases the intensity of the forces (C and P). The increase in the disturbing couple throws the plane into a bank which is still steeper, again increasing the force couple. In such cases, this procedure continues until the plane is executing a tight spiral. When the wings assume a nearly vertical attitude it is obvious that the plane, in executing the turn, noses toward the ground and therefore increases its speed. This fact also increases the disturbing couple. These causes and effects build up on one another until finally the spiralling, descending plane contacts the ground. Need we carry this painful description any further? At least it is a vivid example of the action of how the (C.G.) and resulting centrifugal force *should not* be located in the arrangement of forces.

Undoubtedly it is obvious to many readers now, how the center of gravity and the (C.L.A.) should be arranged in order to create a stable action between forces (C) and (P). Fig. No. 129 shows the correct setup. Here the (C.G.) and the (C.L.A.) are on the same horizontal line. In the front view, therefore, they are coincident and no disturbing couple is created.

In some cases (Fig. No. 130) in which a very high parasol wing is used, a strong force couple is formed by the lift (L') and gravity (G) which helps to counteract the disturbing couple (CP), if this latter couple is not of large magnitude. Thus if the (C.L.A.) is only slightly above the (C.G.) and the wing is well parasoled, the plane may possess sufficient spiral stability. However beyond a certain degree of bank, the righting couple (L'-G) has little effect because the vertical lift component (L') is very small.

The action of centrifugal force gener-

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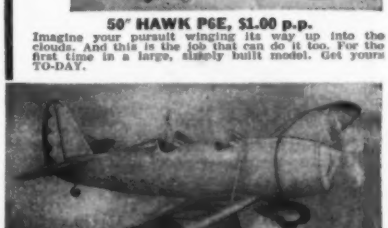

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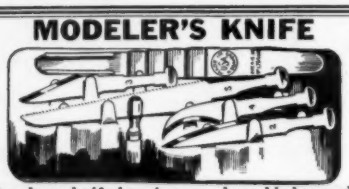

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ated by the weight and speed of a gas model is so important in respect to its stability and consequent successful operation that special effort has been made here to center your attention upon it. It is the "key" to successful gas model design. Obviously this type of airplane must be stable if it is to survive its trial flights. If it crashes, it hits harder than rubber-powered models, due to its greater weight and speed. The result usually is a demolished gas model whereas a rubber-powered model survives under similar conditions.

When designing your first gas plane, concentrate on making it stable. Performance, of course, is an important factor in contest flying, but in any case it is secondary to stability.

If the designer will apply to his gas plane the general principles and procedure outlined in articles No. 54 to No. 56 of this series, on the *Design of a Stability Model*, published in MODEL AIRPLANE NEWS, his craft should be successful from this standpoint. (The plan of the plane, page 10, Nov., 1936, issue, will form the basis of a fine gas model, if enlarged.)

Next month the general procedure of design and a simple method of selecting a stable type of plane for your gas job will be outlined.

Build This Flying Renard R-31

(Continued from page 27)

in the plans. Paint it black and glue in place between the landing gear legs.

Propellers and Flying

Two different props are shown in the plans. The scale prop is only to be used when the model is on display. To carve the flying propeller, take a block of medium grade balsa 6"x1¼"x⅝". Lay out the block as described in the plans and then proceed to carefully and slowly carve and sand away the darkened portions. Now proceed to shape the blades. Use a knife for the first part to get somewhat the general shape. Now take some sandpaper and carefully finish the prop. Remember, the more time that you spend in carefully carving your prop, the better your model will fly.

Take your model to some nearby field and test fly it in the long grass. This procedure is much wiser than rushing your plane to the nearest airport cement runway. Grass gives softer crashes if your model decides to crash. The author's model balanced perfectly; however, no two models are quite alike. You can adjust your model by slightly warping your elevators up or down as the case may be. If you want a real light contest flying scale model, then use 1/32" ribs, 3/64" sq. longerons, hollow struts, landing gear legs and pants. Also leave off all of the fancy "fixings." A model built like this is capable of some extremely remarkable flights. The model seems to "float" along like the indoor microfilm-covered stick models. When the model is covered with microfilm, it provides

for a great deal of astonishment among the audience to see what appears to be a mere skeleton flying. Happy landings.

List of Materials

12 1/16"x1/16"x18" strip balsa
1 1/16"x¼"x24" strip balsa
1 3/16"x3/16"x18" strip balsa
2 1/16"x⅛"x24" strip balsa
4 1/16"x3/32"x24" strip balsa
2 sheets tissue
1 1/64"x2"x18" sheet balsa
1 1/32"x2"x18" sheet balsa
1 1/16"x2"x18" sheet balsa
1 ⅛"x2"x18" sheet balsa
1 ¼"x2"x18" sheet balsa
1 1¼"x⅝"x6" block balsa
6" 1/16" reed
6" ⅛" reed
12" 14 gauge music or piano wire
1 pair 1" balsa or celluloid wheels
Wax paper and pins
1 oz. cement
1 oz. banana oil
8 feet brown rubber
6 brass washers
3 small vials of red, black and silver dope
Celluloid for windshields

Your Career In Aviation

(Continued from page 15)

idea is nullified. It would be well for the student to earnestly apply himself to perfection in this field. Drawings reflect the personality of the individual to a certain degree. A good personality is essential to good work and the ability to meet and discuss problems with others is as important as ability.

Above all things, a knowledge of flying coupled with at least 50 hours of solo experience is most valuable. Now how many aircraft engineers can fly? Very few actually hold transport licenses. Practically all have only limited solo experience if any. Actual experience may be considered non-essential, but in any event it certainly enhances the practical background of experience. A practical engineer should be able to fly the product of his ability. The school of design and construction headed by Ben Howard, Gordon Israel, Matty Laird, Lloyd Stearman, Alexander Seversky, the late Jimmy Wedell, and the late Clare Vance is fast disappearing. These men represent practical engineers at their best. There is something in the composition of these persons that the average engineer hasn't yet attained.

In choosing a profession, some investigation should be made by the individual of his own working ability and characteristics. Some persons are individualists in the true aspect of the word. Some persons can work to advantage in a collective group of technicians. This one characteristic deserves serious consideration. The industry today employs large numbers of technical men. Their duties are highly segregated so that each individual does but a small part of the whole design work. In other words, an individualist would be unfitted for a position on the design staff of a plant employing upward of 50 technicians because his identity would be submerged in the mass with the result that a person of this type would be completely unhappy at his job. The same applies in the case of persons

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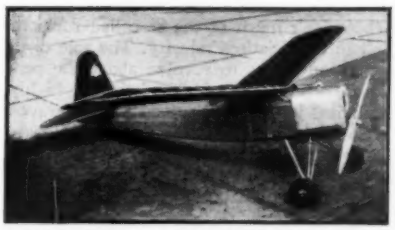

← 54" SCOUT HIGH WING. May be built as a 48", 54", 60" High Wing or a 60" Low Wing. Build a ship that will perform with your Cyclone, Midget, Morton or similar engine.
Kit has full sized plans, cut-out ribs, wire, switch, cement, dope, silk, air wheels, etc. Special cowl not in kit, $1.00 if purchased with kit.

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This model, with a wing span of 70", holds more first and seconds than any other two models. Redesigned for easier, simpler construction with no change in flying qualities. Bent landing gear, 4¼" streamlined air wheels, cut out ribs, full sized plans, a dry kit; no cement or dope. Price $5.50 plus 25c postage in U.S.A.

Peter Bowers, Los Altos, Calif., has won 2 firsts, 3 seconds with his Corben and is building his third one.

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9", 12", 13", 13½", 14", ea. **69c**

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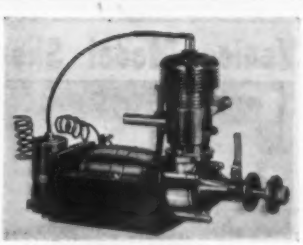

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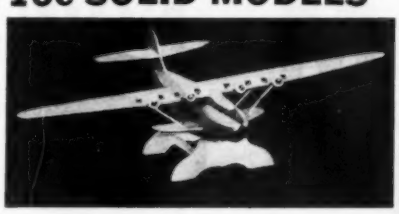

6" to 7½" Wing spans. Hawk, Spad, Fokker D7, Boeing P26, Grumman Fighter, Caudron Renault, China Clipper, Mr. Mulligan, Waco C, Kinner Envoy, Northrop Gamma, Douglas Transport, Gee Bee, Goshawk, Boeing P12, Boeing F7-B1, Wedell Williams, Stinson Reliant. Add 5c postage for each 3 kits.

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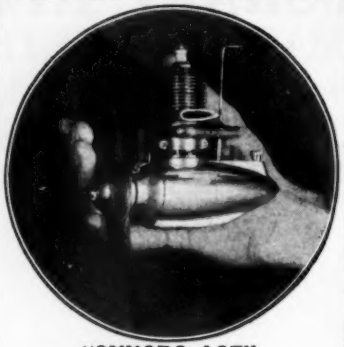

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of the opposite kind. If you are an individualist, choose a small organization where your efforts will be quickly recognized or else start a project of your own. That is the only alternative. If this is impossible, the individualist has to adapt himself to rigid teamwork, and work under authority which is difficult to say the least. If one can determine these characteristics quickly, then much is gained toward the ultimate success. It all involves the question of some persons doing their best work when guided, and others doing their best work when not hampered by rules and technical direction.

Can anyone doubt that this profession offers something to the inner part of the individual that other occupations lack? The man with a good general knowledge of all phases exceeds the latitude of the person whose experience is confined to one subject. There isn't much of the so-called romance left to the aviation industry. The sole compensation seems to revolve about the personal satisfaction of completing a highly technical job in excellent fashion. Few men indeed have reached the success of Donald Douglas, Alexander Seversky, John Northrop, Glen Martin, the late Chance Vought, Reuben Fleet, Claude Ryan, Walter Beech, and other luminaries of the aviation industry. Their success is financial in one aspect but the crowning success has been their efforts to lengthen our economic life by shortening the time to travel between two points. These men whose minds dwell in the realms of the future air travel at substratosphere heights, can truly be said to have achieved the complete mental satisfaction in their contributions to our modern life. That is a worthy goal for the young man of tomorrow.

Frontiers of Aviation

(Continued from page 12)

horsepower at altitudes of around 8,000 feet. The landing gear is rigid and full cantilever and very well faired. Even though it is not retractable it does not cut down the speed of the airplane very much. The ship was built by Larry Brown and modified by Mattie Laird, both of whom are well known as builders of racing planes. Col. Turner flew his speedy racer out to the Pacific coast to participate in the Bendix transcontinental dash. At a stopping point in Albuquerque an accident almost cost Roscoe his airplane. In the meantime the deadline was drawing near for the start of the Bendix, so Roscoe stripped to the waist and went to work on his plane in the broiling hot sun. Covered with grease and oil, he did not look much like the Col. Turner we see at the Races donned in a bright blue and khaki uniform, but he repaired his ship on time and once more took off for Burbank, Calif. However, another mishap prevented him from competing in the Bendix and much to Col. Turner's disappointment he did not arrive in Cleveland until the last day of the Races. A news release was issued by the air race committee that Roscoe averaged 333 m.p.h. in his dash from Albuquerque to Cleveland!

Roscoe Turner's old Wedell-Williams, which has been rebuilt by Mattie Laird, was flown in the Bendix and Thompson Races, but unfortunately it was forced out of both by engine trouble. Joseph Mackey piloted the ship, which is the same in design as when Turner flew it.

Among the many Seversky ships that were present Mr. William Zelcer's blue and yellow low-wing racer was the fastest in closed course competition but on the straightaway Frank Fuller's Seversky was faster and succeeded in winning the Bendix Race and setting a new speed mark for that classic. Zelcer's ship, which was piloted by Frank Sinclair, is the original forerunner of the Seversky single-place pursuit. Though its outside appearance is about the same as the Seversky pursuits now being built for our Army, its construction is somewhat different. Fuller's racer is a Seversky pursuit stripped down for racing. The cockpit enclosure was cut down somewhat and other slight variations in design were made. The other Seversky plane was a two-place pursuit flown by Jimmie Taylor. It was flown around the race course on two trials but barely qualified for the Thompson and did not compete. As with the other planes with large power plants its best performance may be obtained at higher altitudes. The Seversky Company claims that this particular airplane is the fastest two-seater fighter in the world, and has recently sent one to South America. A cruising range of 4,000 miles is claimed for it.

Jimmie Doolittle's Seversky was not completed in time for the National Air Races. It will be much like the Seversky pursuits except for a compartment in the rear for a mechanic. The new Seversky Navy shipboard fighter is again like the Army pursuit with the exception of power plant, armament and arresting gear. A single row engine powers the ship. A new type emergency floatation gear is located along the leading edge of the wing. If the plane

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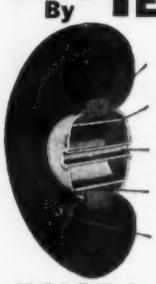

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should make a forced landing in the water this may be blown up and will keep the airplane afloat until rescue arrives.

Other Seversky aircraft in the offing are one with an Allison V-12 engine delivering 1,000 hp., and one with a stainless steel wing built by Fleet-wings for the Army. There is also a story about that Seversky is working on a twin engined pursuit-attack plane with a wing that retracts somewhat when it is in the air.

Another plane that is destined to enter the private plane field is the Sundorph Special that participated in the Bendix Race. Unlike all of its competitors it has a high-wing with a Lycoming engine in the nose. The cabin which ordinarily would seat about four people was filled with a large gas tank leaving room only for the pilot. The wing sits rather high on the fuselage on what resembles the turret structures on the Navy Consolidated flying boats. The fuselage is all-metal with no stringers or longerons, the metal skin taking up all the stress. "U" section former rings help the fuselage to hold its monocoque shape. The wing, rudder and elevators are fabric-covered. The fin and stabilizer are partially metal and fabric-covered. Speeds of over 200 m.p.h. have been obtained with a Jacobs L-5 engine. As the ship raced across the finish line in the Bendix Race it developed a serious wing flutter, and it appeared as though it would fall apart. However the ailerons and flaps managed to stay on the ship and a safe landing was effected. The wing and tail surfaces are full cantilever and the landing gear is of simple unique design. A new air shock absorber developed by the Firestone Tire and Rubber Company is incorporated in the landing gear.

Earl Ortman had a new wing put on his Kieth Rider and a Twin Row Wasp installed in the nose dressed in a full N.A.C.A. cowling with cooling flaps. A well designed enclosure was put over the cockpit and a much speedier airplane was the result.

Schoenfeldt's Kieth Rider was a very fast ship when all six cylinders were percolating, but they did not "perk" all the time, and as a result Gotch, the pilot, just cruised around the course most of the time. It is debatable whether Kling or Gotch had the fastest Menasco-powered plane there, but I think Gotch would have come out victorious every time if his engine was in good working order. It it the same plane flown by Roger Don Rae last year with the wing clipped and a larger engine in the nose, a Super-Buccaneer Menasco. The plane is very slow and sloppy on the take-off but when it once gets under way there is hardly a plane in the United States that can beat it. Its wingspread is 18' and it has a length of 19' 6".

The Haines Special was a completely new ship at the Races and had one of the first Menascos ever built in its nose. Engine trouble never gave the racer a chance. It could easily be mistaken for a small Kieth Rider as it bears a resemblance. The plan view of the wing is like a Douglas DC-2 with straight trailing edge and a decided taper to the leading edge. The front of the windshield is vertical instead of slanting as on most all other racers. The wing is of monospar construction with plywood covering and the fuselage is steel tube with fabric-covering.

The Delgado Trades School lost their D-12 racer last year when it caught fire and have built another one on a smaller scale which looks much like it. The entire plane is covered with plywood and painted black. A new Menasco C-6-S-4 engine of 544 cu. in. displacement. It is named the Delgado Flash but it did not flash for one reason or another though it did place in the money.

Chester's Jeep, McKeen's Brown B-2, and Rae's Folkerts were not revamped for the Races this year but Kling's new Folkerts had one of the large Menasco C-6-S-4 engines to power it. This was the plane that won the Thompson Trophy Race when it looked like Turner and Ortman "had it in the bag." Its span is 16' 4" with a length of 22' and it is similar to other Folkerts racers.

The Loose and Wittenbeck Specials are something of the past and are too low-powered to compete in the higher displacement classes.

But the speed demon of them all was Steve Wittman and his two super-fast racers that broke all sorts of records. The planes are not shining examples of the best in streamline designing but nevertheless due to Wittman's expert designing and piloting they were the fastest in their class. His Curtiss D-12 racer was built very light

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7 ft., Wt. 5 lbs.

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3/16x3/16	.04
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1/4x1/2	.08
1/4x1	.10
3/4x3/8	.09
1/4x1/2	.10
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(Special for Gas Models)

36" Lengths

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1/8x3	.09
3/16x2	.07
3/16x3	.11
1/4x2	.09
1/4x3	.15
1/2x2	.18
1/2x3	.30

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1/4", 3 ft. for .05
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2 poles..25c each
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These liquids are specially made for gas powered models and should not be confused with those used for rubber powered models.

4 oz.	.18
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Gas Model dope and paper adhesive same price as cement.

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(In five, 5-foot lengths)

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3/4"x3/4" foot .30

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12x16 sheet .18

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All Colors

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each ..... .10

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5/16 dia. 1 ft.	.20

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1/16x1/16 .....100, 5c
1/16x1/8 .....33 .....for 5c
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1/16x1/2 5 for 5c
3/32x3/32 .....30, 5c
1/8x1/8 30 for 5c
1/8x3/16 12 .....for 5c
1/8x1/4 10 for 5c
3/16x3/16 .....9, 5c
1/4x1/4 6 for 5c
1/4x1/2 3 for 5c
1/2x1/2 2 for 5c

18" SHEETS

1/64x2 6 for 10c
1/32x2 8 for 10c
1/16x2 8 for 10c
3/32x2 7 for 10c
1/8x2 6 for 10c
3/16x2 3 for 9c
1/4x2 3 for 10c

3" sheets or 36" lengths, double above prices; add 10c packing charge for 36" lengths.

18" PLANKS

1x1 5c; 1/2x2 6c
1x1¼ 6c; 1x2 10c
1x3 15c; 2x2 18c
2x3 23c; 2x6 39c
3x3 40c; 3x6 75c

PROP. SHAFTS, REAR HOOKS

doz. 8c

CELLULOID

6x8 .....5c
12¼x16 .....18c

INSIGNIA SHEET

24 and stripes 5c

ALUMINUM

.0003x31/2 6ft 5c
.003 in. 6x6 5c
.010 in. 6x6 6c

PROPELLER BLOCKS

1¼x 5½x 5 8—5c
1¾x 5½x 6 6—5c
5/8x1 x 7 4—5c
5/8x1 x 8 3—5c
5/8x1¼x10 2—5c
5/8x1¼x12 5c ea.
1x1¼x12 4c ea.
1x1½x15 6c ea.

IMP. PROPELLERS

Type	Standard	Balsa	Birch
5"	Diam.	.05	.07
6"	Diam.	.06	.08
7"	Diam.	.09	.10
8"	Diam.	.12	.15
10"	Diam.	.17	.20
12"	Diam.	.22	.30
13"	Diam.	.25	.35
14"	Diam.	.30	.40
15"	Diam.	.35	.50

DUMMY RAD. ENGINES

1¼" d. 18c; 2" d. 20c; 3" d. 25c.

GUNS WITH RING MOUNT

1¼" 10c, 1¾" 15c.

NOSE BLOCKS

1x2x1	1c
2x2x1	2c
2x2 1/2x1	3c
3x3x1	5c
3x3x2	8c
3x3x3	10c

REED

1/32-1/16-1/8, ...6 ft. for 5c

BAMBOO

1/16 sq.x12, 36, 5c
1/16x1/4x11, dz. 10c

MODEL STANDS

Small 15c

RUBBER

.045 ....25 ft. 5c
1/16 sq.. 20 ft. 5c
1/4 flat..18 ft. 5c
Skein 50c

WASHERS

1 dz. 1/4 or 1/4 1c

THRUST BEARINGS

Small ....doz. 10c
Large ....doz. 15c

NOSE PLUGS

1/4" .....doz. 8c
3/4" .....doz. 15c

WIRE

6-8-10-12-14 .....6 ft. 3c

DOWELS

1/16x6 ...doz. 5c
1/8x18...2 for 5c
3/16x1/4...2 for 5c

SANDPAPER

5 sheets.....8c

WOOD VENEER PAPER

20x30..1 for 10c

ALUM. TUBING

1/16, 3/32, 1/8 ft..... 7c
3/16 or 1/4 ft 10c

WHEELS per pr. Birch Bias Cellu

1/2	.01	.03	
3/4	.02	.04	.05
1	.03	.05	.07
1¼	.04	.08	.10
1½	.07	.10	.15
3	.20	.15	.30

CAMEL'S HAIR BRUSHES

Small 3c; Lge. 5c
Extra large.....8c

PURSUIT MACH. GUNS

3/4", 1¼" or 1¾" each 5c

BOMBS

3/4" 4c; 1¼" 7c
3" 12c

METAL PROPELLERS

2 blades 3 blades
1½" 5c 8c
2½" 10c 10c
3½" 15c 20c
4½" 20c 25c

CELLULOID PANTS, per pair

1/8" to 1" ...18c
1¾" to 1½" 33c

ALUM. COWLINGS

1¼" 15c 2" 18c
3" 25c 4" 40c

Specify whether anti-drag or closed

MACHINE-CUT BALSA PROPS

5" 4c; 6" 5c;
7" 6c; 8" 7c;
10" 8c; 12" 10c
15" 13c

ENGINE AND COWL (Cellu.)

1¼" dia. 18c
2" dia. 20c
3" dia. 25c

CLEAR DOPE OR BANANA OIL

1 oz. 5c 2 oz. 7c
4 oz. 13c 1 pt. 45c
Thinner same price as clear dope

COLORED DOPE

White, yellow, orange, blue, red, green, olive drab, black, silver, gold.
1 oz. .06 2 oz. .10
4 oz. .19 1 pt. .65

COLORLESS CEMENT

1 oz. .05 2 oz. .08
4 oz. .15 1 pt. .50

TISSUE, AA

All col., doz. 19c
Silver 5c
Superfine, wh. 5c

BUSHINGS

All sizes doz. 5c

WOND. WATER SPRAYER 15c

MODEL PINS

1/2" or 1" pkg.5c

WING AND TAIL LIGHTS

12" 10c; 18" 15c; 24" 20c.

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LOOK AT THIS ASSORTMENT!

	1 oz.	2 oz.	½ pt.	1 pt.
Berryloid Clear Model Dope	$0.10	$0.15	$0.35	$0.50
Berryloid Banana Liquid	.10	.15	.35	.50
Berryloid Model Cement	.10	.15	.40	.60
Berryloid Model Dope Thinner	.10	.15	.30	.45
Berryloid Reducer	.10	.15	.35	.60
Berryloid Anti-Blush Reducer	.10	.15	.45	.80
BOXX Model Primer Surfacer	.10	.15	.50	.85
Berryloid Model Pig. Dope				
Standard Colors	.10	.15	.40	.65
Reds, Maroons, International Orange, Intense Black	.10	.15	.45	.75
Berryspar Model Varnish		.20	.65	1.15
Berryloid Superfine Rubbing Compound		.20	.45	.75

Include postage of 5c for each 1 oz. or 2 oz. bottle; 10c for half-pints; and 15c for pints.

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EAST
Polk's Model Craft Hobbies, Inc., 421 Seventh Ave., New York City, New York.

MIDDLE WEST
Dallaire Model Aircraft Co., 10140 Crocuslawn Avenue, Detroit, Michigan.

WEST
Reginald Denny Industries, Inc., 5751 Hollywood Boulevard, Hollywood, California.

with steel tubing fabric-covered. A large spinner was on the propeller inside of which was a fan with several blades which blew air form a small opening in the spinner into the radiator and cooled the "V" type engine. The landing gear is made from about 3/16th thick sheet steel. The two ends are bent down from the fuselage and act as the entire structure of the landing gear! It undoubtedly has good shock absorbing qualities. The plane clocked 275 m.p.h. in qualifying for the Thompson Trophy Race, setting a new record. Wittman's smaller ship had a Menasco engine and was about the same in appearance as its big brother and likewise passed everything that got in its way.

Michel DeTroyat was present this year but did not compete. He would have had much stiffer competition this year, but his racer would still have beaten the field if it performed as well as it did last year. However, it was a good sight to see so many racers on hand and with prize money increasing steadily American racing planes should be unbeatable in any category within the next few years. It was disappointing not to have Harry Crosby's ship on hand but it was not completed on time. A newly designed wing is being built on his ship now with more taper to it. The tail skid as well as the landing gear will be retract-

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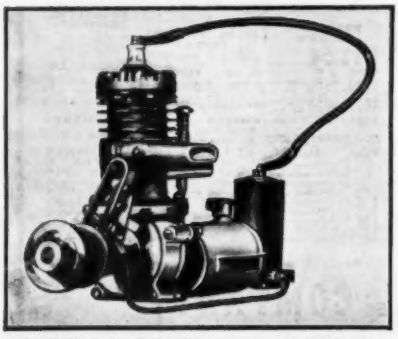
THE SEASON'S GREETINGS FROM A-J-C MOTORS



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Kit $7.25 DESIGN PROP. $1.00 **Assembled $9.85 f.o.b.**

FOR COMPLETE INFORMATION SEND 3c POSTAGE

A-J-C MOTORS INGLESIDE, ILL.

The Bendix Race
Los Angeles-Cleveland $20,000 in prizes

Pilot	Plane	Time	Speed (m. p. h.)	Prize
Frank Fuller	Seversky	7:54.26	258	$9,000
Earl Ortman	Kieth Rider	9:49.21	.....	5,000
Jacqueline Cochran	Beechcraft	10:29.08	.....	3,000
Frank Sinclair	Seversky	11:02.33	.....	2,000
Milo Burcham	Lockheed "12"	11:03.58	.....	1,000
Eiler C. Sundorph	Sundorph	12:17.00	.....	.....

Fuller flew on to New York averaging 255 m.p.h. to win additional prize money of $4,000. Miss Cochran won an added $2,500 for being the only woman entry.

The Thompson Trophy Race
20 laps around a 10 mile course—200 miles
Free for All

1.	Rudy Kling	Folkerts	46:42.54	256.910	$9,000
2.	Earl Ortman	Kieth Rider	46:43.11	256.858	5,000
3.	Roscoe Turner	Turner	47:16.86	253.802	3,000
4.	Frank Sinclair	Seversky	47:33.07	252.360	2,000
5.	S. J. Wittman	Wittman D-12	47:58.76	250.108	1,000
6.	Ray Moore	Seversky	50:20.00	238.411	300
7.	C. H. Gotch	Schoenfeldt	55:05.63	217.810	250

McKeen dropped out in the 13th lap. Mackey dropped out in the 17th lap.

The L. W. Greve Trophy Race
20 laps around a 5 mile course
For planes with a maximum of 549 cu. in. displacement.

1.	Rudy Kling	Folkerts	25:49.91	232.272	$4,500
2.	S. J. Wittman	Wittman	25:51.79	231.990	2,500
3.	C. H. Gotch	Schoenfeldt	25:54.45	231.593	1,500
4.	Roger Don Rae	Folkerts	26:45.73	224.197	1,000
5.	Marion McKeen	Brown B-2	26:49.70	223.644	500
6.	Frank Haines	Haines	33:45.71	177.715	.....

Clarence MacArthur dropped out in 5th lap.

Thompson Trophy qualifying speeds

Wittman	S. J. Wittman	275.672
Folkerts	Rudy Kling	268.024
Turner	Roscoe Turner	263.620
Kieth Rider	Earl Ortman	263.023
Seversky	Frank Sinclair	252.136
Chester Special	Art Chester	246.410
Wedell-Williams	Joe Mackey	246.154
Folkerts	Roger Don Rae	242.589
Schoen-Rider	C. H. Gotch	235.602
Seversky	Ray Moore	223.717
Seversky	Jimmie Taylor	223.173
Brown B-2	Marion McKeen	221.130
Delgado	Clarence MacArthur	201.342
Haines	Frank Haines	199.115

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SPEED BOAT

SEA-HORNET

Hydroplane Speed Boat

Easy to build, with threaded steel driveshaft and coupling, aluminum rear strut, cast aluminum propeller, special driving dog and stuffing box, the Sea Hornet construction kit makes a real gas-powered speed boat. The frames, sheer planks, motor mount beams and all special parts are ready cut from sheet balsa. The planking and deck pieces are easily made from 20 step-by-step illustrations explain every construction and installation detail. **The Sea Hornet** is the most thoroughly worked out gas-powered speed "Car Wood Style" model speed boat kit ever presented. Buy the only complete with plans, instructions, and extra materials. All parts, fittings, boat today. **Master Kit**—Complete with special cement assembled stuffing box and 1 pint to build exactly as illustrated. Also fabric, covering and 1 quart dope to protect and waterproof. Includes everything but the engine . . . Master Kit, less **$11.50**

Special Kit—Same as Master Kit, less only: Cement, dope, fabric, wiring and propeller drive. Stuffing box and all other fittings . . . **$7.50**

Plans, instructions only, 50c.

An ideal model boat engine, the Mighty Marine is designed to run with greater efficiency at high speeds. The Mighty Marine is **air cooled.** No troublesome water-jacket hook-up is required. Easily adjusted on land, a full-power run at top speed makes a full-power run at top speed and does not water-cool suddenly to slow down or "conk" upon launching. For trouble-free peak performance from your model boat, install the Mighty Marine. **Specification**—Bore, 7/8"; Stroke, 15/16; 1/5 h.p. at 8500 R.P.M. at 5200 R.P.M., 1/4 h.p.

Order the Mighty Marine in kit form, complete with flywheel— **$11.40.**

Completely assembled and block-tested on special mounting skids— **$17.75.**

Send Postal Money Order. All Prices Post Paid. (For motor kit information see Bunch Motor ad in this magazine.)

MIGHTY-MARINE
SPEED BOAT ENGINE

STEPPING OVER THE WAVES at a fast clip, the Sea Hornet speed boat breaks all records for thrilling gas-powered achievements.

Authentic snapshots of the racing Sea Hornet in action on lakes, sea and river, attaining speeds over 20 M.P.H. the 24-inch Sea Hornet is run in a circular path on a 50-foot line anchored to a stake or from a small boat.

BUNCH MODEL AIRPLANE CO.

5009 South Hoover Street . . . Los Angeles, California

able now, and we may soon see great things from this small racing plane. Of all-metal design and having been thoroughly wind tunnel tested to get the maximum of speed it might be called the "perfect" racer.

The accompanying tables will give you an idea of the speeds attained and who won the various races. The Thompson Trophy Race was the most exciting with the Greve a close second. As the gun was sounded nine Thompson starters took to the air in a race horse start. Marion McKeen whose ship has a very fast take-off was up in front followed by Frank Sinclair in his Seversky racer. Rudy Kling's Folkerts was rather awkward in taking off and Ray Moore, flying Fuller's Seversky, had to swerve over abruptly to avoid a crash. Turner's old "57" was away before his new ship got off and it was many laps before Turner finally passed Mackey. Just ahead of Turner was Ortman and Gotch took up the trailing position. Wittman in his D-12 powered plane took the lead as the nine ships rounded the first pylon. For the first few laps the race course was a jumbled mass of racing ships. However Wittman had taken a commanding lead with McKeen losing ground to the other fliers. The planes on the whole were so closely matched in speed that it took some time for them to spread out around the course and made things very exciting. From the start it appeared that Col. Turner would have a task on his hands to win the race with almost the entire field ahead of him. Each lap he managed to pass one of the contenders and for awhile it was a neck-and-neck race between him and Mackey. In the meantime Ortman had wedged his way into second place after a hard struggle with Sinclair and Kling. As the half-way mark was reached in the two hundred mile race Turner managed to pass Ortman to gain second place, but Wittman was still opening up space in the field. Several times Gotch made a bid but each time engine trouble hampered his progress. Kling was flying high up above the field and was not in any too promising a position as the tenth lap was completed, but with another ten to go he still had a chance. The race was as good as won by Wittman as the 15th lap was passed in the grueling grind. He had almost lapped the entire field. Turner was just one pylon length ahead of Ortman with Sinclair fourth, Mackey a doubtable fifth as Kling began creeping up on him at the fifteenth lap. McKeen had been forced down on the 13th which left a field of eight, and at the 17th lap it was seven as engine trouble retired Mackey from the grueling grind. Engine trouble or no Gotch remained in the race to the finish. As the 18th lap was passed by Wittman the fireworks started. He zoomed high in the air as his engine began to falter and Turner took the lead! Ortman gave his ship all she had but still Turner was increasing his lead. In the meantime Kling was steadily passing one by one his competitors in his small 250 hp. mid-wing maintaining his altitude. Even the high-powered Severskys could not hold him back. As the ships neared the back stretch on the last lap Turner thought he missed a pylon and turned to circle it. This gave Ortman the lead with Kling at his tail. As they came down the straightaway course to the finish line Ortman still held the lead. Then Kling put his altitude to effect. In a spectacular dive Kling just nosed out Ortman to win the Thompson trophy. Unlucky Roscoe came in a close third, Sinclair fourth, Wittman fifth, Moore sixth, and Gotch seventh. It appears that the ultimate in speeds in closed course racing has been just about obtained without making the racers too dangerous to fly. Additional power will not increase speeds considerably. Judging from Wittman's performance light weight must be the answer for more speed. It is doubtful if we will see an average speed of 300 m.p.h. in the Thompson Race for two or three years yet. Perhaps a small twin-engined ship may be the answer.

News briefs: Curtiss is building two pursuit planes powered by Allison V-12 engines and one with the new huge 1,400 hp. twin-row Hornet! They are also busy on the construction of their new four-engined sub-stratosphere transport at the St. Louis plant. Chance Vought is developing a mid-wing Navy seaplane fighter. Jimmie Dunn, the movie star, has a new all-metal low-wing ship designed by Mr. Harlow and built at the Pasadena Junior College. A new company known as the Lobil Aircraft Corp., has been formed in Los Angeles for the deign and construction of military aircraft. The Crusader Aircraft Company is now considering building a twin-engined ship entirely of birch. Next month we will have more news on the airplanes mentioned here as well as comments on the Istres-Damascus-Paris Air Race.

(Continued on next page)

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How to Build a Model of the Crosby Racer

Build the entire model of balsa wood which may be purchased from almost any of the model supply companies listed in this publication. It is always best to purchase the wheels also and get a tube of model cement.

Make the fuselage first. Trace the outline of the top view of the fuselage on paper and then lay it over the balsa wood. Be sure the length of the wood is running lengthwise. Draw around the outline again, pressing heavily so as to make a groove in the wood. Then cut around the outline with a jig-saw, leaving a slight margin of excess wood which should then be shaved down with a sharp chisel.

In a like manner draw on the side view in the correct position on the fuselage block and cut this to shape. Shave down the corners with a razor blade and give the fuselage the contours shown by the cross-sections. Go over the entire fuselage with coarse sandpaper. Brush off all dust and then, using a fine grade, sandpaper the surface to smoothness.

The same procedure should be followed in making the remainder of the model. The wing may be made in one piece and fitted into a groove cut in the bottom of the fuselage. Be accurate and take plenty of time. The tail units are most easily cut from sheet balsa with your razor blade.

When all the parts have been made begin the assembly of the model. Lay the fuselage in flying position on a flat surface and connect the wing with plenty of cement. Make sure that the wing is perpendicular to the fuselage and then let connections dry. Join the tail units in place next. When these connections have dried lay the model on its back and join the landing gear in place. Small straight pins may be used as axles for the wheels. Apply plenty of cement to the undercarriage. A propeller may be carved from scrap wood and joined to the nose. The best way to do this is to shape out two blades and a spinner and then cement them together.

Touch up all joints of the model and then go over the entire ship with fine sandpaper. The entire model should then be painted silver except for the pilot enclosure which should be white. All trimmings may be most easily put on with black ink and a drawing pen. Many coats will have to be applied before a smooth finish is obtained. It is best to go over the entire model after the first coat has been applied with sandpaper again to get best results. The model will then be completed.

An Indoor Flier for the Novice

(Continued from page 10)

board or wood and some pins. Using as few pins as possible you hold the prop to the board bent to the desired pitch with a little camber on each blade. Put this over ar. oven or something warm to make it dry sooner. When this is done, attach a prop shaft and washers and there you have a prop as good as a carved one and in addition much lighter.

Adjustment and Flying

Attach a loop of 3/64" rubber to the

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This Syncro Ace is a low priced streamlined motor with plenty of power. Speed is rated at from 500 to 10,000 R.P.M. The timing is an approved type vastly superior to any motor now on the market because it is placed above oil and grime interference. Factory tested, mounted on skids, complete with coil, condenser, etc.; they're going fast, order now.

YOU CAN BUILD YOUR OWN GAS ENGINE WITH THESE MOTOR KITS

At left—MIGHTY MIDGET—the Model sensation of the year—can be assembled and run in a few hours. Complete kit Postpaid $9.85. Assembled and Block Tested—Postpaid $14.00.

At right—GWIN AERO—claimed to be the finest high-speed miniature engine obtainable at this low price. Complete kit—Postpaid $11.35. Assembled and Block Tested—Postpaid $18.25.

OHLSSON ENGINES

At a recent meet in California, of 160 entrees, over 30% were Ohlsson powered, and 4 out of the first 10 place winners were Ohlsson powered models. This motor is making a remarkable reputation for itself. Many outstanding features are incorporated. All parts interchangeable. Rated at ⅛ H.P. Complete—Postpaid $16.50

23D PRECISION ENGINE

This is a new small size engine, only 3¾ in. high, but rated ¼ H.P. Plenty of speed with little fuel consumption. Special price—Postpaid $14.95

TLUSH "SUPER ACE"

A marvel for power, strength, and speed. Does away with all worry about crankcase breakage or shaft bending. Will fly models from 2 to 12 lbs. Weight 10 oz.; speed 900-12,000 R.P.M. Alloy Crankcase; SAE Alloy Steel Crankshaft. Complete—Postpaid $21.50

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New 3½ oz. motor for 3 to 5 ft. models. 1/10 H. P. Easy starting and delivers sufficient power to fly models up to 2¼ lbs. Complete—Postpaid $17.50.

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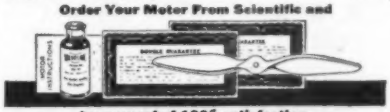

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Every motor (including motor kits) purchased from SCIENTIFIC carries a "Double, Iron-clad Guarantee." In addition, you receive absolutely free with each motor or motor kit a tru-pitch hardwood propeller especially designed for the particular engine ordered, a generous supply of Valvoline SAE-70 oil, full instructions on the care and operation of the motor, and the motor is sent postpaid anywhere in the United States!

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"Gas Model Headquarters"

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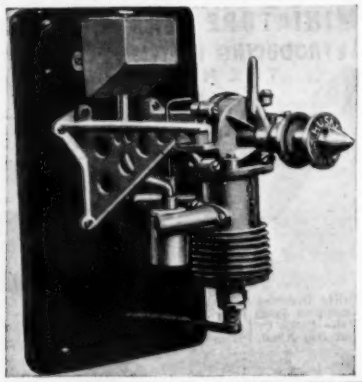
TIME MARCHES ON—

AS ORDERS AND INQUIRIES ARE POURING IN FOR **THE HUSKY JR.** ON SUNDAY, OCT. 3 NINE PERFECT FLIGHTS WERE MADE WITH A HUSKY JR. POWERED MODEL—WEIGHT 3½ LBS. WINGSPAN 6 FT. 10 IN. MODEL BUILDERS WERE AMAZED AT THIS WONDERFUL PERFORMANCE. ORDER YOUR HUSKY JR. TODAY AND ENJOY YOUR GAS MODEL.

Engineers have perfected a New Alloy 10% lighter in weight than Aluminum. As this New Alloy is used throughout in the construction of THE HUSKY JUNIOR—months of experimental tests have failed to indicate a single weak point in the fundamental design and construction—and absolutely no signs of wear. The special float feed type Carburetor allows an even flow of gas at all times and for EASY STARTING the HUSKY JUNIOR is in a class by ITSELF. The HUSKY JUNIOR DEVELOPS REAL POWER. Swings a 12" Prop. and takes a (3 pound) Model off the ground with perfect ease.

It is only when YOU KNOW all the operating advantages of THE HUSKY JUNIOR that You will get a TRUE APPRECIATION of its BRILLIANT PERFORMANCE. EASY STARTING and its ADDED POWER PLUS the WEARABILITY of this NEW ALLOY will make THE HUSKY JUNIOR the Most OUTSTANDING Miniature GAS MOTOR on the MARKET.



NOTE

No special timing gadgets needed on your model if you use the Husky Junior. Short contest flights of 10 seconds up to 60 seconds can be made by adjusting the carburetor float and shutting off the gas line before take-off.

Bore ⅝", Stroke ⅝", Weight 4 Oz., Speed 250 to 10,000 R.P.M. The Husky Jr. Runs INVERTED or UPRIGHT as you wish. Each motor is THOROUGHLY TESTED, RUN IN and FULLY GUARANTEED. ORDERS WILL BE FILLED IN ROTATION.

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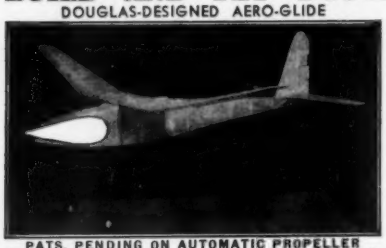
DOUGLAS-DESIGNED AERO-GLIDE



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Wingspan 41", length 30", wt. 3 oz. Kit contains all parts to assemble folding propeller—MARCO BALL BEARING propeller shaft—M & M model wheels—special brown contest rubber motor—glue, dope, tissue, wing ribs and other parts printed "on AAA" sheet balsa—all strips cut to size—full size detail 3-view drawing.

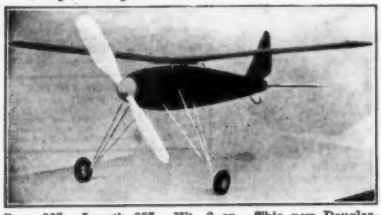
"Aero-Glide" Kit complete $2.25 Postpaid, U.S. and Can.

DOUGLAS-DESIGNED "SPACE CONQUEROR"

This model equipped with Free-Wheeling Prop. Wing span 36", length 27", wt. 2.8 oz. The new "Space Conqueror" Hydroplane, Landplane and Skiplane—all in one model—change from one to the other in two minutes. This model has an unofficial record of 19 min. 25 sec., 2500 ft. altitude with M & M Model Wheels. Complete Kit with M & M Model Wheels, $1.75 P.P.

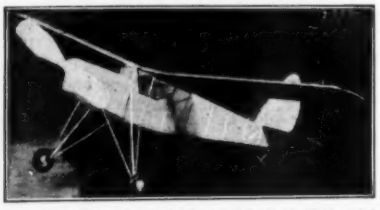
Douglas-Designed AEROBAT with Automatic Folding Prop. Span 26". Length 19". Kit Complete $1.25, P.P.

Douglas-Designed "UNIVERSAL SPEEDSTER"



Span 30". Length 25". Wt. 2 oz. This new Douglas-Designed speed model has absolutely EVERYTHING you need. ALTITUDE—SPEED—ENDURANCE, perfect Glide and M & M Model Wheels for smooth landings. Complete Kit with M & M Model Wheels only $1.50 P. P.

Douglas-Designed "FLYING CLOUD"



Wing span 36 in.; length 24 in.; weight 3 oz. This model is the result of nearly a year of experimental work and for consistent flying this model is in a class by itself. Complete Kit with M & M Model Wheels $1.75 P. P.

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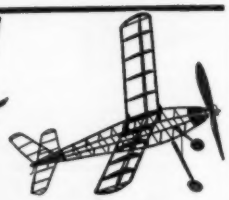

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COMPLETE, READY TO FLY

These Contest Models make flights of several minutes. They are real ENDURANCE fliers.

18" R O G.....$1.25
18" Fuselage Model.....$2.50
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model and you are ready to test it. Wind it up fifty times and let it go. It should make left circles of about six or seven feet in diameter. If the model dives, raise the tail boom slightly. If it stalls then move the boom down a bit. If for some reason the stalling or diving is persistent then the only thing that can be done is to bend the bamboo struts backward or forward slightly.

The reason the wing is offset on the model is to prevent it from diving while it is turning with the torque.

The model when carefully and properly built and adjusted will turn in some very unusual flights—provided there are no accidents.

N. A. A. Junior News

(Continued from page 18)

tional Boy Scouts of America, has laid out an ambitious program of activities leading to the rating of members as either Air Scout Cadets, Air Scout Mechanics, Air Scout Observers, or Air Scout Pilots. This troop has the distinction of being the first organization of its kind east of the Mississippi. Everett C. Plummer is Scoutmaster. The Troop Committee is composed of Gill Robb Wilson, Director of Aviation for the State of New Jersey, Lt. John E. Murnane, New Jersey State Police, Capt. Milton St. Clair, Air Corps Parachute Specialist, and Major Douglas Goodale, Air Corps Reserve.

To become eligible for membership in the Air Scout troop, the boys must be First Class Scouts, fifteen years of age, and have the recommendations of their home troop Scoutmaster.

Upon passing the requirements for an Aviation Merit Badge, they become AIR SCOUT CADETS, with the insignia of the Merit badge, scarf with troop insignia (winged 44) and Senior Scouting band.

Actual work in dismantling and assembling of an airplane motor is performed and instructions given, upon which an examination is held for the rating of AIR SCOUT MECHANIC, which entitles the Scout to a miniature metal propeller insignia on his flight cap.

After the successful accomplishment of studies and examinations in Meteorology, Radio, Photography, Navigation, Maps, Operation of Airplane Motors, Air Marker Design and Lay-Outs, and actual participation in painting an Air Marker, a Scout becomes an AIR SCOUT OBSERVER and may wear half wings.

To have the privilege of wearing full metal wings, as an AIR SCOUT PILOT, the observer must qualify in further instruction on airplane motors, Department of Commerce regulations, make and successfully fly a gas-powered model airplane.

While the National headquarters has not sanctioned the actual flying of airplanes by Boy Scouts, the instruction and training gives them a foundation for actual flying and mechanical work either as a sport or profession.

The program for the year includes a number of interesting speakers, motion pictures, athletic meetings and educational trips to various aircraft manufacturing plants and participation in air meets and aviation shows.

Scoutmaster Everett C. Plummer, who is an N.A.A. Model Contest Director of some renown, conducts a weekly column in the Sunday *Times-Advertiser*, Trenton, New Jersey, which is packed with club news, general model aircraft notes, and a question and answer section.

Results of the 1937 Mississippi Valley Model Airplane Tournament

INDOOR

St. Louis Arena—August 28, 1937
Parks Airport—August 29, 1937

Open Stick Type

1. Carl Goldberg, Chicago—19 min. 07 sec.
2. Joe Matulis, Chicago—17 min. 43 sec.

3. Curtis Janke, Sheboygan, Wis.—13 min. 42 sec.

Senior Stick Type

1. Milton Huguelet, Chicago—20 min. 17 sec.
2. Bob Christie, Chicago—17 min. 00 sec.
3. Charles Stewart, Chicago—16 min. 51 sec.
4. Charles Belsky, Chicago—16 min. 11 sec.

Junior Stick Type

1. Wilmer Feltmier, St. Louis, Mo.—12 min. 14 sec.
2. Arthur Beckington, Chicago—10 min. 19 sec.
3. Francis Kuntz, St. Louis, Mo.—6 min. 46 sec.
4. Geo. Lanbros, St. Louis, Mo.—6 min. 12 sec.

Open Indoor Fuselage

1. Roy Wriston, Tulsa—14 min. 44 sec. 9/10 (New World Record)
2. Roe Matulis, Chicago—8 min. 25 sec.

Indoor Fuselage Senior

1. Richard O'Barski, Chicago—13 min. 57 sec.
2. Walter Erbach, Sheboygan, Wis.—11 min. 34 sec.
3. Dennis Turner, Chicago—10 min. 43 sec.
4. Donald Dodd, St. Louis, Mo.—10 min. 21 sec.

NEW WORLD'S RECORD CLASS "A" R. O. G. STICK TYPE MODEL (OPEN)

Roy Wriston, Tulsa, Okla. 10 min. 05 sec. (Former record 9 min. 59 sec., Joe Matulis, Chicago)

OUTDOOR

Stick Type (Junior)

1. Arthur Beckington, Rockford, Ill.—1 min. 59 sec.
2. Bill Riordan, St. Louis, Mo.—1 min. 54 sec.
3. Wilmer Feltmier, St. Louis, Mo.—1:00 min. 17 sec.
4. Harold Harris, St. Louis, Mo.—1.00 min. 7 sec.

Stick Type (Open)

1. Roy Wriston, Tulsa, Okla.—8 min. 54.6 sec.
2. Curtis Janke, Sheboygan, Wis.—6 min. 59 sec.
3. David Seltzer, St. Louis, Mo.—2 min. 22.4 sec.
4. Joseph Matulis, Chicago—2 min. 20 sec.

Fuselage (Open)

1. Joseph Matulis, Chicago—4 min. 2 sec.
2. Roy Wriston, Tulsa—3 min. 22.3 sec.
3. David Seltzer, St. Louis, Mo.—
4. Steve Edwards, St. Louis, Mo.—1 min. 17 sec.

Fuselage Type (Junior)

1. Albert Magenot—1 min. 23 sec.
2. Rob't Gibbs—1 min. 22 sec.
3. Billy Riordan—1 min. 2 sec.
4. Donald Sheets—56.8 sec.

Stick Type (Senior)

1. Wallace Simmers, Chicago—17 min. 3 sec.
2. Walter Huguelet, Chicago—12 min. 2.2 sec.
3. Vernon Sears, Tulsa—11 min.
4. Rob't Guilfoy, St. Louis, Mo.—9 min. 56.6 sec.

Fuselage Type (Senior)

1. Charles Belsky, Chicago—8:45.
2. Harold Foester, St. Louis, Mo.—2:51.
3. Roy Marquardt, Burlington—2:51.
4. Richard O'Barski, Chicago—2:09.

Amateur Sweepstakes

1. Fred Zaiser—2 min. 50.5 sec.
2. Herman Seltzer—1 min. 25 sec.
3. Albert Maginot—1 min. 16.1 sec.
4. John Dequarth—1 min. 5 sec.

Gasoline Event

1. Ray Marquardt, Burlington, Ia.—23 min.

AIR CHIEF

IDEAL'S GAS MODEL THE AIR CHIEF

Trophy winner (designed by S. Kowalik) won the I.G.M.A.A. Consistency prize by staying up twice as long as the closest competitor in 3 successive flights!

$6.00 complete without motor

5 FT. 1 INCH MODEL OF TROPHY WINNER

Power the Air Chief with any standard miniature engine for the thrill of powered flight!

Everything you look for in a Gas Model Plane! Consistency of flight and long gliding ratio. Sturdy construction that withstands landing shock. Dependable, selected materials that mean steady, sure performance. Clear, easy-to-follow plans, which simplify construction. Tedious details of construction already completed, which makes assembling easy. The AIR CHIEF is simple to build . . . fun to fly!

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DEALERS! IDEAL'S AIR CHIEF represents unbeatable dollar-for-dollar value. Write for information as to exceptional dealer discounts. You can't afford to be without the AIR-CHIEF!

GAS MODEL EQUIPMENT

Red rubber, wood hubs. Easily reinflated. Pneumatic Rubber Wheels

2½"—$.60 Pr.
2¾"—.75 Pr.
3" —.90 Pr.
3¼"—1.10 Pr.
3½"—1.25 Pr.
Postage 10c extra

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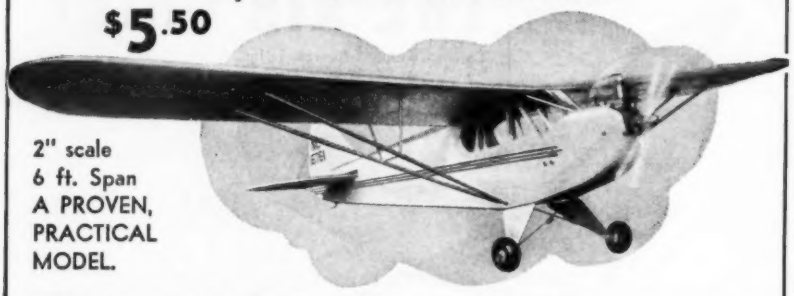

2" scale
6 ft. Span
A PROVEN, PRACTICAL MODEL.

Fascinating to Build—Thrilling to Fly—Uses any Standard Gas Motor.

Plane has completely enclosed cockpit and is equipped with fully adjustable stabilizer and tail surfaces. Plane can be quickly taken apart and assembled on the flying field. Modern shock cord type landing gear.

Kit is complete. All materials for constructing plane as pictured are furnished including full size detailed plans with pictures, clear notes and instructions. There is nothing else to buy, except the motor.

An innovation in model construction is the COLOR CODE to help you identify the different strips of balsa and bass used in building this model.

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Complete Kit, less motor, with pneumatic rubber airwheels and single pole double throw snap switch $6.90

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2. Chester Peterson, Parks Air College—21 min. 19 sec.

3. Ray Podolsky, St. Louis, Mo.—16 min. 17.8 sec.

4. Charles Bleittner, St. Louis, Mo.—11 min. 23 sec.

Stix, Baer & Fuller, Grand Awards
Roy Wriston—Tulsa, Okla.

Two Trip Winner on Chicago & Southern Airlines

Arthur Beckington—Rockford, Ill.
Richard O'Barski—Chicago, Ill.

How to Build the "Little Varmint"

(Continued from page 21)

equally spaced of 1/8 x 3/16. The wing mount may now be built onto the top of the fuselage; all this construction is of ¼ spruce. This wing mount is rather a novel arrangement as it provides an unobstructed cooling tunnel for the engine when the cowling is used. The top is not covered over but left open as well as the rear; when the wing is on this makes a complete air tunnel from the engine.

The balsa fillet blocks for the stabilizer are merely glued to the top of the fuselage and shaped to fit the contour of the stabilizer; there are two fillet blocks, one at the front and rear of the stabilizer.

The nose from Station No. 1 forward is now built onto the front of the fuselage. The balsa pieces are cut to shape first and then glued directly to Station No. 1. The deck of the nose which is of hard balsa of ¼" stock is glued on to the front of Station No. 1 with only enough clearance between them to fit the width of the removable motor mount, and also at the same level as the top of the motor mount when it is fitted into the fuselage. This mount was built for a Cyclone engine and any other engine will require a slightly different width in the engine mount. Study the plans of the nose construction for the details. After the framework of the nose is finished it is planked with balsa veneer 1/16" thick cut in strips of approximately ½" width; the planking runs crosswise to the fuselage and after sanding and doping it will make a smooth finish. The cowling is optional but it gives the model a much better appearance. This cowling will allow ample cooling even in hot weather due to the arrangement of allowing the air to pass completely through. The front block is shaped and then hollowed out of a medium block of balsa; the thickness is ⅛". The rest of the construction is all balsa and then covered with silk and doped.

Motor Mount

The entire motor mount is of spruce or similar hardwood and is of very simple construction. The battery box is built right in the mount, the two contact plates are

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of thin sheet copper or of tin, the wire leads are soldered directly to these contact plates. The two bed rails on which the engine is fastened are of heavier wood, ¼ x ½ to withstand the strain of the mounting. The coil may be fastened just in front of the positive contact plate of the batteries. The thrust line parallels the top longeron of the fuselage when the mount is in the fuselage. Stations No. 1 and 3 are now fitted to receive the motor mount. The cross pieces on these two stations are of ¼" sq. spruce glued and nailed in place as these two stations carry the motor mount. The front view of Station No. 3 shows also how the fuselage fairing strips appear.

Landing Gear

The landing gear is next to be made. The entire gear is of ⅛" spring steel music or piano wire. There is only one soldered joint in the landing gear. The landing gear with the exception of the axle wire is made of one piece soldered together at the front where the axle piece is soldered to the two ends. A small piece of 1/16" wire is bent into a loop wide enough to receive the axle wire and is soldered in place over the axle to allow shock travel of an inch and a quarter. 4½" air wheels are used. The landing gear plates are made of 1/16" sheet metal and drilled for the shock travel and pivot holes; these plates must be slipped on the landing gear wire before soldering and when the landing gear is soldered together the plates are fastened to the fuselage with ¼" wood screws.

Wing

The first step in the wing construction is to make a template of the Clark Y section. All the ribs are of 1/16" balsa sheet of medium hardness. Both spars are of hard balsa, the front spar is ¼ x 1 and the rear spar is ¼ x ⅝. The leading edge is shaped from hard balsa ⅜" sq., the trailing edge is ¼ x ⅝ shaped to a thin edge making a triangular section. When both halves are made they are butt joined at the two spars, the leading and trailing edges. These joints are glued solidly after giving the proper dihedral and should be kept propped up until the glue is thoroughly dried. Splints of ⅛" hard balsa are fitted to both sides of the front and rear spar joint and thoroughly glued, wrapped with thread and then with silk, after which it is doped to make a solid joint on both spars. A small splint may be glued to the rear of the leading edge joint. The top center section of the wing covering the three center ribs is now planked with 1/16" balsa with the strips running crosswise. After sanding well and doping this greatly reinforces the center section. The wing is covered with silk like the rest of the plane.

Tail Assembly

The stabilizer is made much in the same manner as the wing only there is no dihedral to make and there are no joints to glue in the center. The ribs are made of 1/16" veneer following the template given. The tips of both the wing and stabilizer are made of ¼" hard sheet balsa cut into strips and angled together to form the curve. The spars are ¼ x ½ for the front and ¼ x ½ for the rear, both are of hard balsa. The rib on which the rudder is glued should be from ⅛" balsa; there are of course two of these. The leading edge is of ¼" sq. and the trailing edge of ¼ x ½ shaped. The rudders when finished are glued directly to the top of the third rib from the ends on each side. The rudders have no shaped ribs but are of 1/16" veneer which is sanded to a curve after the rudder is built. The one spar is of ⅛" sq. hard balsa and is set through each rib by a slot cut to fit; the finished width of the rudders should not be over ¼". The bottom piece of the rudder is shaped to fit the top curve of the stabilizer rib it is to be glued on. Two external braces on each rudder give the necessary strength. The rudders should be covered and doped before gluing to the finished stabilizer.

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Reg. U.S. Pat. Off.

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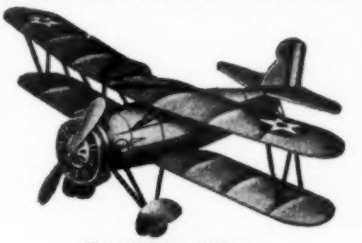

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The "IMP" 4-in-1 GAS KIT

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64 in. Wing Span 1/6 Original Size
Can be powered with Gasolene—AC:CO Gas, Compressed Air, or Rubber Motor.

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Including Fully Finished Notched and Webbed Paulownia Wing Ribs
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2x3, each ..... .35
2x4, each ..... .45
2x6, each ..... .60

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½x⅞x5 ..... .05
½x1¾x6 ..... .06
⅝x1x7 ..... .12
¾x1x8 ..... .16
⅞x1x9 ..... .23
¾x1¼x10 ..... .25
¾x1¼x12 ..... .30
1x1½x12 ..... .35
1x1½x15 ..... .50

BAMBOO

1/16 sq. x 14.
1 gross for ..... .10
1/16x¼x11.
1 doz for..... .05
1/16x¼x11.
1 gross for..... .45

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1/16 dia.....50 ft. .18
3/32 dia.....50 ft. .20
⅛ dia.....50 ft. .25

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Thinner same price as clear dope.

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3/32 O.D., 5 ft. .30
¼ O.D., 5 ft..... .30
5/16 O.D., 5 ft. .38
¾ O.D., 5 ft..... .43

CELLULOID WHEELS

¾" per doz..... .21
1" per doz..... .22
1⅜" per doz..... .31
1⅝" per doz..... .55

BALSA BALLOON WHEELS

½" dia., per doz. .09
¾" dia., per doz. .11
1" dia., per doz. .14
1⅜" dia., per doz. ..... .19
1⅝" dia., per doz. ..... .35
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Large, per doz..... .10
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#10 ..... .25
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1½" long, 3 for.. .10
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3½" long, 3 for.. .18
4½" long, 3 for.. .22

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4½" long, 3 for.. .26

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3", 3 for..... .50

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7", per doz..... .35
8", per doz..... .38
9", per doz..... .40
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The wing is fastened to the fuselage with rubber strands as well as the stabilizer which fits into the two fillets at the end of the fuselage. The wing may be moved either way for balance; the angle of the stabilizer which is built for 0 degrees may be adjusted by a small peg at the front or rear of the stabilizer. On the bottom of the front spar of the wing a ¼" sq. strip is glued on securely; this gives the wing the proper amount of incidence. A tail wheel of about 1" diameter of rubber will help the model take off.

"Gas Lines"

(Continued from page 24)

first plane, which he built in 1934.

We have a few interesting pictures of the Quaker City Gas Model Contest, which was held recently in Philadelphia, Pa. Picture No. 7 shows the activities on the field during the meet. The background was used as headquarters.

Picture No. 8 shows William Effinger's "Super-Buccaneer," which won first place in the limited motor run event. First place was won in the duration event, in which 1/28 oz. of fuel per pound of weight was used, by Lieutenant Flynn, who is an ex-Air Corps man, and former champion speed boat racer. It is significant that a man of this type is flying gas models.

Picture No. 9 shows a very unusual gas job built by Joe Plute and John Sakaley of 224 Washington Street, Pueblo, Colorado. You will note from the picture that the tail is carried by two booms which are fastened to the wing. The motor is mounted in the nose. It has a span of 7 feet 7 inches and is powered with a Brown engine. These two young men are members of the Imperial Aircrafters Club.

Picture No. 10 shows a busy and tense moment while fueling up one of the ships in preparation for a flight at the Quaker City contest.

Mr. Effinger sends us an interesting bit of information. Roy Kuennen made a 57½ minute official flight at Grand Rapids, Michigan, on Sept. 19th under I.G.M.A.A. rules. This flight was made with a "Super-Buccaneer." Apparently this flight breaks the I.G.M.A.A. record of twenty-three minutes, eighteen seconds, made by Maxwell Bassett, and with which he won the I.G. M.A.A. trophy.

As yet we have received no official announcement from Mr. Kuennen of his flight. If he will let us know all the details and if the meet was sanctioned by the I.G.M.A.A. we will tell him whether or not he is entitled to hold the I.G.M.A.A. trophy.

The motor, during the flight, ran for two minutes, ten seconds. The plane disappeared into a cloud after thirty-eight minutes, but reappeared after ten seconds. The chase was given up by the timers after 57½ minutes. It was found over thirteen miles away from the starting point.

Harold G. Sinsky of 2123 North Farwell Avenue, Milwaukee, Wisconsin, a leader of the Milwaukee I.G.M.A.A. unit, writes us that members of the Wisconsin Civil Air Corps held a gas model contest at the airport in Milwaukee recently. There were about forty or fifty entries from Milwaukee and at least thirty from other cities in the state. The Helldivers Club, one of the largest in the city, with a membership of twenty-five, put on a very excellent show.

One of the members, with his ship, is shown in picture No. 11. It is Charles Vogel with his scale model Rearwin. This gas model is considered by members of the club as one of the finest models in the district from a standpoint of workmanship and finish. It is also a remarkable flier.

Picture No. 12 is a most unusual shot from a photographic standpoint. However the scene is quite a common one about five hours before any large contest. The picture shows a contestant at three o'clock in the morning in the workshop of Richard Lober, the night before the big San Diego contest.

Here is another argument for those who are against gas models. Invariably it causes insomnia. For the information of those who don't go to contests, it appears that the average model builder stays up all night to complete a plane that he should have finished a month or so before. This practice is not to be commended inasmuch as it unquestionably reduces the efficiency

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of the model builder during the contest on the following day. In fact, this model builder admits it.

Now we are going to give away a secret. The model builder in the picture is Peter Bowers of Los Altos, Calif., Box 357. He disillusions us by telling us that the picture was posed. We thank him for his interesting contribution.

Yakima, Washington, is one of the gas model centers in the northwest, and is the home of Unit No. 57, the Northwest Gas Model Club. Mr. Joseph Morris of Selah, Washington, R.F.D. 2, Box 26, secretary of the club, has been kind enough to send us several pictures of one of their recent contests. This contest was held under the auspices of Unit 57 and the Yakima Y.M.C.A. Picture No. 13 shows several models on the starting line and a portion of the crowd which is always present at such contests.

Picture No. 14 shows Roscoe McLeran with his gas model Stearman-Hammond "Y" plane. This is a beautiful job. It is interesting not only because it is scaled, but because of its unusual design. The ship has a seven foot wing span and is powered with a Brown motor.

Picture No. 15 shows the Elf-powered model built by Mr. Van Court. It won two events at the contest and was the smallest ship entered.

Picture No. 16 shows Charles Woodworth and his specially built racing job, which is powered by a Baby Cyclone motor. It won first prize for appearance. Mr. Morris tells us that, sad to say, this little ship caught fire previous to its dreamed-of first flight and was completely destroyed.

We wish to remark on the design of this ship. It is one of the finest designed racing jobs that has ever come to our attention. From its general design setup unquestionably it embodies all of the factors required for a very stable flight arranged in their proper positions. You will note the high line of trust, slightly parasoled wing and the lateral area which is quite low. This is helped by the lower part of the fuselage at the rear extending down a considerable distance. The center of gravity of such a ship would not be extremely low relative to the center of lateral area, unless the batteries were placed directly at the bottom of the fuselage. Even then the center of gravity and center of lateral area would not be far apart. In turns this ship should be exceedingly stable in spite of its high speed.

Of course, high speed in a gas model, or in any airplane, causes faults in design to show up prominently which would not appear in models which were very light and of low speed. Due to building light airplanes of low speed many model builders are able to "get away with" improperly designed ships. It takes a real designer who knows what he is doing to build a heavy speed job.

Picture No. 17 shows Jack McLaughlin's T-D Coupe, which was built from plans published in MODEL AIRPLANE NEWS, except for the faired in landing gear. Many builders have had great success with this little ship. However, McLaughlin has unquestionably improved its performance considerably by fairing in the landing gear. By doing this he has lowered the center of lateral area. Invariably this is too high in

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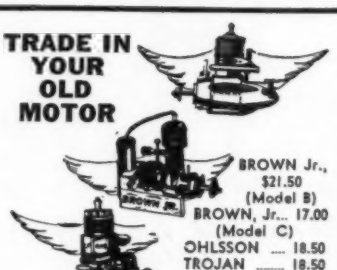

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$2.95

A gigantic model of this popular ship guaranteed to fly 500 ft. Kit complete with every item required including a 6" finished balsa wood engine cowling with nose plug. Formerly $5.00. Special, Postpaid, $2.95.

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the average gas model. The change also has the added effect of giving it a very realistic appearance.

By the way, builders who have ships with a tendency to spiral dive and fly erratically might try fairing in the space between the landing gear struts, as in the case of this T-D Coupe. Invariably it will improve the flight of the airplane, the center of lateral area being lowered by this procedure.

UNIT NEWS

Tennessee

One of the active clubs in Tennessee is the Nashville Model Aero Club. It boasts of about twenty members from twelve years up. It was started in 1933 at the Hume-Fogg High School. The unusual thing about this club is that its younger members have sold the idea of gas models to their parents. In fact, not only the fathers compete with the boys, but also some of the mothers.

Louisiana

In the State Championship Model Airplane Meet held recently at Lafayette, La., A. W. Powell of the Gas Model Club of New Orleans, won the gas model event with a time of 4:52½. This entitled him to the Evangeline and Governor Leche trophies. Walter Williams, R. Basnett and H. Jumonville, all members of the same club, were runners up.

The Gas Model Club of New Orleans cooperated in a commendable fashion at the contest. Entrants came to the contest from New Orleans, Baton Rouge, Lake Charles, New Iberia, Rayne, Franklin and other points of the state.

We are indebted for this information to Mr. Rocco S. Glorioso of Iberia Street, New Iberia, Louisiana. He was contest director.

Texas

Ralph Pressler, secretary of the San Antonio Society of Model Engineers, 120 Broadway, San Antonio, Texas, I.G.M.A.A. Unit No. 21, writes:

"We have had some excellent model flying weather here the last month or two. Though we have not broken or set any records, we have had some wonderful flights and a lot of real fun. We still fly every Sunday morning on Kelly Field, the army training field. They are and have been very nice to us, having extended us many favors and facilities, such as military police, etc., whenever we had crowds out there or something special on any Sunday morning.

"The club membership has continued to enlarge and to hold much interest in 'gas modeling'. We have also been successful in creating and holding much interest in gas models among business men and aviation enthusiasts in this locality.

"The club is going to Corpus Christi, Texas, tomorrow, Sept. 5, to attend and enter a gas model contest and general model builders' meet. We are in high spirits and hope (intend) to bring back our share of the prizes."

California

Elbert J. Weathers, corresponding secretary of Unit No. 18 of 2720 Poinsettia Drive, San Diego, Calif., sends us the following report of his club:

"The San Diego gas model group, Unit 18 of the I.G.M.A.A., has been completely reorganized. Formerly known as the San Diego Gas Model Club, the group is now known as the San Diego Aeroneers. It has recently become an N.A.A. Junior Chapter, in addition. The revised rulings allow a maximum of 25 members only. Anyone lagging in model activities is to be dismissed upon majority vote of the members. With this set limit of members, it is hoped that a much more careful check can be kept on every individual.

"Mr. J. M. Roche, of this city, who is an official N.A.A. Contest Director, has taken much interest in the revised club and will undoubtedly be of valued service to the Aeroneers in future activities. The newly elected officers of Unit 18 are as follows:

President—Layton Webb.
Vice Pres.—Albert Erickson.
Sec'y-Treas.—Daniel S. Halacy.
Corr. Sec'y—Elbert J. Weathers.

"In an I.G.M.A.A. practice meet on Aug. 15, Judson Marsden, member of the club, exceeded the official record by approximately 5 minutes, obtaining a flight of 28 minutes plus, at which time his model disappeared from sight, but was recovered later. The Aeroneers are especially proud of the flight made by one of its members, Clifford White, at the California State Fair Contest, held on Sept. 6. White's model flew 20 minutes, after the motor had run only 40 seconds. In the gas event, entrants were limited to a maximum motor run of 35 seconds. Unfortunately, White's engine ran 5 seconds beyond the maximum allowed, thus disqualifying him. The plane ruled the winner made a flight of only 2

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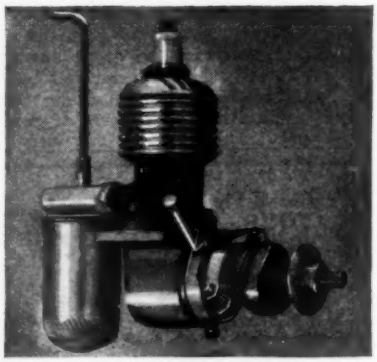

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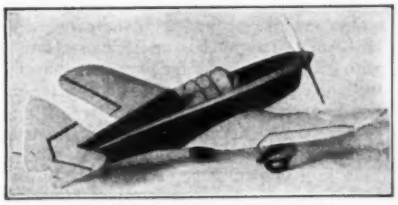

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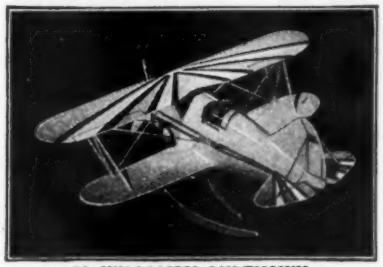

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wingspan 25 inches, in Balsa... **$2.00**

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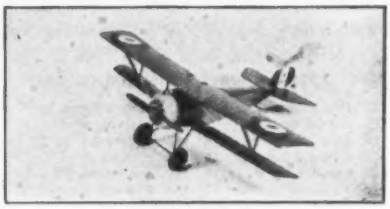

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wingspan 21¼ inches, in Balsa..

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wingspan 18½ inches, in Balsa..

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wingspan 19¼ inches, in Balsa..

minutes after the motor was cut.

"All gas model builders of San Diego, and practically our whole state, are very sour towards the restrictions already passed by a couple of typical "blue law" states, and hundreds of signatures have been obtained, with no coaxing whatsoever, from California gas modelers and citizens not indulging in the hobby, on the petition being circulated for use against the narrow, unjust propaganda being waged against gas model activity by "we know who." A test case should be made, if at all possible, financially speaking for the most part, by some individual who may be unfortunate enough to be a gas model builder in Massachusetts or any other state which may have passed such unjust legislation upon a certain number of its inhabitants."

New Jersey

The Linden Model Aircraft Club sends us the following report of club activities:

"Frank Yuhasz of 622 DeWitt Street, Linden, N.J., whose model had a flight of eleven minutes and fifty-six seconds, won the first Union County Gasoline Model Airplane championship in the meet held on Saturday, August 21st, at Hadley Airport. The meet was sponsored by the Linden Recreation Commission in conjunction with the Linden Model Aircraft Club, and was sanctioned by the National Aeronautic Association.

"The model disappeared out of sight over Metuchen still soaring, and has not been recovered yet. Yuhasz's winning model was a T-D coupe powered by a Baby Cyclone motor; it was painted red and black. Yuhasz represented the Linden Model Aircraft Club, of which he is treasurer.

"Competition for the next four places was keen with Walter Mationschek of the Queen City Gasoline Model Club of Plainfield, taking second place with a flight of six minutes and 72/5 seconds. His entry was a Super-Buccaneer, powered by a Brown Junior motor.

"Third place was won by Howard Simmons, also of the Queen City Club, with a flight of 5 minutes, 5 seconds. His Buccaneer model was powered by a motor made by himself.

"The Linden Model Aircraft Club's own plane, a Flying Quaker, powered by an Ohlsson engine, placed fourth, with a flight of 4 minutes, 43 seconds. It was flown by Ralph Mann and Carl Frank.

"Another Queen City Club member, Charles Quagliato, captured fifth place, when his plane stood in the air 4 minutes, 15 seconds. His model was a Flying Quaker, powered by a Brown Junior motor.

"Others who had models entered were: Hampden Smith, Wilbur Lawson and Edward Lawson, of Linden; Frank Ropis, Jack Tolkach and Robert Kubli, of Hillside; Elmer Grantzki, of Garwood; Ben Nienert and John J. Brown, of Elizabeth, and John Quigley, of Plainfield."

Pennsylvania

Mr. Harry E. Moyer of 612 Walnut Street, Lebanon, Pa., head of Unit No. 28, writes:

"The fourth annual model airplane meet was held in Lebanon on Saturday, August

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BROWN JR. MOTORS

C-Model $17.00
B-Model $21.50

New C-Model. Price $17.00
Motor weight, bare, 6½ oz. 1/5 H.P.
Height 4¾ inches. Length 5¾ inches.
R.P.M. range 1200 to 10,000

It pays in the long run to get a Brown Jr. Motor. Guaranteed performance. Both models have many refinements. Special fuel filter to prevent stalling on steep climb. Two-piece fuel tank is easy to clean. Fool-proof wiring. Special coil and spark plug give top performance.

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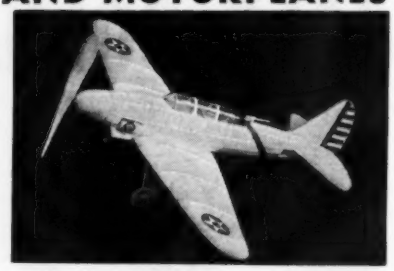

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2 sets 60c Postpaid U. S. A.

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F 38	Art Chester Racer	F 44	Brown B3
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Ready-built planes of all kits available—they are guaranteed. Supply limited. Send 3c stamp for folder on complete line R O G and Scale kits and ready-built models. Mighty Midget Gas Motor,..... **$14.00.**

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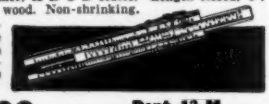
Accuracy guaranteed. In genuine leather case with instruction booklet. Only $1.00 postpaid.



SEVAN CO. Dept. 12-M 7 E. 42nd St., N. Y. C.

28th, under the sponsorship of the Exchange Club and sanctioned by the N.A.A. It was by far the most successful meet held to date, having 57 entrants from 6 states. There were 50 gas models entered and 1/16 oz. of fuel per pound was allowed. The winners were:

"Arthur Eck of Johnstown, first. He received as a prize a gas engine. Second place went to Irvin Shiffer, of Elizabethtown, who won a set of M & M air wheels, and third place went to George Guest of Scranton, who received a propeller. Benjamin Hayden of Reading, who won two dollars, was fourth, and Carroll Carter of Washington, D.C., won one dollar as his award for fifth place.

"As a matter of courtesy the members of the local unit did not fly their ship in the contest but acted as judges and timers."

New York

We have some news from F. C. Hubert, president of Unit No. 77 of the I.G.M.A.A.

This club has changed their name from Manquenaus Gas Model Club to Winged Demons and the membership has risen to fifteen. They have been fortunate enough to have been granted permission to use the Seversky Airport at Farmingdale, Long Island, New York, to carry on their experimental flights. Nearly every Saturday a number of gas model fans will be found at this field.

As head office of the I.G.M.A.A. we wish to extend our appreciation for Mr. Seversky's courtesy in extending the use of the field to I.G.M.A.A. members. We understand that great interest has been shown by several members of the concern in the flights of the ships.

New Jersey

Mickey De Angelis, president of Unit No. 20, the Trenton Aero Society, sends us a most interesting and noteworthy letter. It is:

"We have been flying gas models from Mercer Airport for over one year without a single bit of damage to property or spectators. I would advise forming a gas model board in each city to draw up a set of rules for flying gas models, cooperating with the airport officials.

"One parent remarked that his boy is no longer running around with the gang. He now builds gas models and his association with other gas model builders has changed his entire perspective of good and bad. This boy has won several meets, and is now one of our best model builders. This is a true case in our town. This boy has always been in a jam of some sort. Today he has an interest which occupies all of his spare time. This brings him in contact with other young men of character who do not stand on street corners insulting young ladies or shoot dice in some back alley.

"The last mentioned habit is something against which there REALLY should be a crusade, NOT THE CLEAN, HONEST AND EDUCATIONAL SPORT OF FLYING AND BUILDING GAS MODELS."

NOTICES

Mr. Bill Kleinhaus of 823 Lincoln Avenue, Evansville, Indiana, writes that the local airport at Evansville is against the flying of gas models and at the prompting of an organization which hoped to ban gas models gas models have prohibited flying them from the local field.

We call on all gas models in the vicinity of Evansville to get together in a protest meeting. We suggest that a committee be formed of older builders who will call upon the airport manager and endeavor to have him lift his ban with proper regulation for flying models as outlined in the National Aeronautic Association section of this magazine. If this procedure is not successful we suggest that you send a personal delegation to the mayor himself as it appears that this airport is under municipal direction.

At any rate, we suggest that you write to the National Aeronautic Association, Dupont Circle, Washington, D.C., stating the facts of the case.

Dick Lewis of 110 Grove Street, Clark Summit, Pa., writes that he has lost a Quaker Flash gas model, colored cream and vermillion with a Brown engine No. B4193. If found will the owner return the model to Lewis?

Mr. Karl N. McMullen of 2530 North 75th Street, Omaha, Nebraska, a leader of gas model activities in this community, notifies us that the contest originally scheduled for August 25th, and twice postponed, has been held.

Mr. Glen Chambers, who lives in Sunnyside, Washington, Route 1, and is a member of I.G.M.A.A. Unit 57, writes that many members of a prominent rubber powered model organization which prohibits gas models have pledged themselves to support gas models. He says he has not heard one member of this organization support the ban on gas models. We quote—"Maybe this is a one man safety drive."

We are printing a set of rules recently drawn up by Unit No. 77 at their recent meeting. These may be of aid in any new club which is just being organized. The rules are as follows:

1. Every member must build at least one

gas model.

2. A club insignia be made and put on the rudder of each gas model.
3. Any expense for postage is to be taken from club treasury.
4. Each member shall pay 40 cents dues each month.
5. Treasury money to be used for purchase of gas motor.
6. Club shall build a gas model with each member participating in the construction.
7. Club motor may be used in a member's model at contests only, and it may only be used if the member's own engine is broken or he has none.
8. When the club goes to a contest, each member must pay driver of car amount decided upon before the contest, for transportation.
9. The club will vote on taking in new members.
10. The club will be known as "The Winged Demons," Unit 77, I.G.M.A.A.
11. Any damage done to property by a member's model will be paid for by the club as a whole with treasury money. Owner must fix own model.
12. Commissions will be given as follows:

2 minute flight .....Lieutenant
5 minute flight .....Captain
10 minute flight .....Major
20 minute flight .....Colonel
30 minute flight .....General

Comments

There have been several comments on the gas model ban that are worthy of note. Mr. Herbert K. Weiss S.B. of 452 Hampshire Street, Lawrence, Mass., writes as follows:

"I wish to say that I am heartily in accord with your fight to prevent gas models from being banned. There is no sport in existence which aids in the development of a young man as an intelligent thinking citizen as does that of building and flying gas models.

"'A gas model is a menace to personal and private property.' So is a football, a baseball, an air rifle. But consider the contrast. A youth knocks a baseball through a closed window. Eight times out of ten he lights out for home and his parents settle for the window. But if his gas model goes through that same window, it must be retrieved. He explains, apologizes, learns diplomacy, promises to take care of the damage, is more careful about wind directions in the future.

"'A hazard in the home.' Need more be said than was contained in your edit.

"'Gas model builders disregard laws governing personal rights and property.' The only laws they disregard are those which forbid youth to exercise its ingenuity, to think things out, to do other than has been done by the last generation. They are black sheep because they take

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2 Ft. MODEL OF THE FAMOUS CLIPPER SHIP

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The true actual photo shows you how beautiful the ship looks. It is completely streamlined leaving no parts of the engine exposed. Many new features are found on the plane, such as: needle valve extension, single leg landing gear, raised tail surfaces and inverted engine which also can be mounted upright.

Kit is neatly packed in an attractive box with cut out ribs, shaped propeller, large cans of cement, dope, wire, aluminum sheet, celluloid, screws, nails, balsa wood strips cut to size and many other parts to complete the model.

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Deluxe Kit with air wheels and colored dope....6.50 P.P.
Full size plans....50c P.P.
Special offer. The New Brown Junior engine (with piston rings) and our deluxe kit....$22.50 P.P.

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3/16x1/2 ..2 for .10
3/16x1 2 for .19
1/4x1/4 ..6 for .25
1/4x1/2 ..4 for .25
1/4x1 ....3 for .25
3/8x3/8 ..3 for .25
3/4x1/2 ..3 for .27
1/8x1 ....1 for .18
1x1 ....1 for .25

GAS MODEL BALSA
36" or 18" length of gas model balsa can be had. See our regular list of model supplies below Please mention its use.

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5 Ft. Lengths
1/32x2 2 for .15
1/16x2 2 for .17
3/32x2 2 for .20
1/8x2 ....2 for .23
3/16x2 2 for .27
1/4x2 ....2 for .30
1/2x2 ....2 for .25
Double the 2" price for 3" widths.

BAMBOO PAPER
24x36 ..each .05

COVERING SILK
1 Yd. 36x36...60

AIRCRAFT SPRUCE
5 Ft. Lengths
1/32x3/16 ..1 for .04
1/16x1/4 ..1 for .05
3/16x3/16 ..1 for .07
3/16x1/2 ..1 for .10
3/16x1..1 for .15
3/16x3..1 for .40
1/4x1/4....1 for .09
1/4x1/2....1 for .14
1/4x1....1 for .17
1/4x3....1 for .45

STEEL MUSIC WIRE
5 Ft. Lengths
1/16 dia.... .10
3/32 dia.... .15
1/8 dia.... .25

HARD ALUMINUM ANGLE
1/8x1/2 per ft. .15

HARD ALUMINUM SHEET
1/16x3x12.. .28
1/32x3x12.. .15

M & M AIR WHEELS
3 1/4" pr....$1.50
3 1/2" pr.... 2.50
4 1/2" pr.... 2.75

OHLSSON AIR WHEELS
3 1/2" pr....$1.50
4 1/2" pr.... 1.75

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Clear Dope
Colored Dope and Thinner
1/2 pint can.. .35
1 pint can.... .60

GAS MODEL PROPS
12".....65
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16".....$1.00

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This book contains more than 80 detail plans of both gas and rubber powered models.
Price $1.00 P.P.

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8x10 each.... .07

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1/4" dia. doz. .05

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All orders over $1.50 sent postpaid. Minimum order for 5 Ft. lengths is $1.00.
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FREE with every order of $1 or more we will send a complete R.O.G. balsa kit with full size plans, rubber, thrust bearing, wire, wheels, balsa cut to size and a complete set of insignia. (Kit worth 25c if bought elsewhere.)

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3/32x1/4 ..10 for .05
1/8x1/8 30 for .05
1/8x3/16 ..14 for .05
1/4x1/4..12 for .05
3/16x3/16 ..8 for .05
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1/2x1/2 2 for .05

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1x2x18 1 for .12
2x2x18 1 for .20
1 1/4x2x18 ..1 for .15
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1x1....1 for .05
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Wood can be had in 36" lengths or 3" widths by doubling the 18" price. We also cut special sizes. Send in for prices.

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3 oz.....15
1/2 pint 8 oz....35
1 pint 16 oz. .60

WHEELS PER PR.

Size	Brch.
1/2"	.01
3/4"	.02
1"	.03
1 3/4"	.04
2 1/2"	.07

Balsa

	Celu.
1"	.07
1 3/4"	.06
2 1/2"	.09

FREE bushings with balsa wheels.

BROWN RUBBER
1/16 flat ..20 ft. .05
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1/16x1/4x15 ..6 for .05
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1/16 dia. x 12 doz. ..05
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1/16 dia. per ft....07
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1/8 dia. per ft....08
3/16 dia. per ft....10
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010.... 6x6....06
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1 1/4" 10
2" 15
3" 25

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1/16" dia. shaft 35

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Sheet containing 4 sets of American, French, English and German.
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All colors
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Light and strong for rubber powered models. Large sheet is 24 x 32. RED and BLUE ONLY.
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7" 10
8" 12
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Extra blades
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Small per doz .10
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4x5 03
Model pins per pk.....05
Dope brushes
small 03
large 05
Nose plugs each 01

WIRE
010 & 020
5 ft. 02
028 & 034
3 ft. 02

WASHERS
Small or large, doz. 01

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FREE postage on all orders over 50c. Add 10c on all orders under 50c. Foreign orders add 15c.

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232-45th Street Brooklyn, N. Y.

Gas Model Fans, Notice!!

I, the undersigned condemn the program to ban the flying of gas models as unnecessary, unpatriotic and against the welfare and aeronautical education of Americans.

Signature .....

Address .....

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Occupation ..... Age .....

(Fill in, cut out and mail to I.G.M.A.A., MODEL AIRPLANE NEWS, 551 Fifth Avenue, New York City.)

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12" SOLID SCALE BOAT OR 'PLANE MODELS 50c P. P. in U.S.

Plans designed by Nick Limber, premier model designer

EVERY KIT GUARANTEED
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Your Choice Of
S. S. REX
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BOEING TRANS. 247
LINDY'S MILES MOHAWK
LINDY'S "SPIRIT OF ST. LOUIS"
STINSON RELIANT R-1
VOUGHT SBU-1.

Above—Boeing Trans. 247

Right—Navy Vought SBU-1

Above—S.S. Rex

Left—U.S.S. Lexington Aircraft Carrier

These deluxe kits contain two large bottles of colored lacquer, cement, all parts clearly printed on balsa, bamboo, full-sized detailed plan, many extras. Be the first in your community to build these new models. Rush your order today.

U. S. and Foreign Dealers: Hitch your sales wagon to a line of model stars. Write for dealers' or jobbers' quotations today. Exclusive territory open.

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Don't miss the January Issue.
ON SALE DEC. 8th.

here's the KNIFE *for you!*

Comet KEEN-EDGE MODEL-BUILDER'S KNIVES

THE PERFECT KNIFE FOR PERFECT WORK! Blades of finest surgical steel cut through thick Balsa. Can be sharpened or replaced. Knife complete, 10c. Replacement blades, 3 for 10c. At all dealers.

Look! FREE PHOTOS

NOW—a photo of a famous plane FREE with every 25" 25c flying model kit! Get the complete set of 16—paste them in the Comet Album, only 5c at your dealer.

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Everybody's doing it—saving the free photos found in all 25" 25c Comet flying model kits until they get the complete set of 16. They're beauties—and when you have all of them pasted into your album, you've got something worth while! All the famous fighting planes included in the group. Here's an extra Comet value that every model builder will want to take advantage of.

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the short cut across the hill of self advancement to the pastures of self respect instead of following the herd through the beaten and muddy paths of precedent and prejudice.

"'They are a hazard to planes, etc.' I have yet to see pilots killing every bird they can find because it, too uses the upper air.

"I do feel however, that some sort of licensing system should be employed, which would place a minimum age limitation on the youths building gas models. A situation which has been mentioned by neither side of the argument has been painfully apparent locally for some time. This is the amount of money which is wasted by youngsters who can't afford it on gas models which they never finish.

"The fourteen year old model enthusiast of a foreign family with a total income of possible twenty to twenty-five dollars a week runs errands, sells papers, wheedles change from his parents and finally invests twenty dollars in a gas model. Of three such cases which I have seen, one ruined his engine by improper handling before it was even installed in the plane. The other two washed out their investments on the first day of test hopping.

"It is no good to say here that model clubs and instruction would have prevented this, because the boys had had their misfortunes before joining a club. A licensing system would have deferred the modelling adventure until an age where profit would have been derived from the experience and the money been spent for a good purpose. Meanwhile rubber powered models would have increased instead of obliterating the boys' interest in flight.

"For the older boys and young men, there is no question about what is right. A gas model in intelligent hands is not dangerous. And what radio amateurs did for the development of their field, gas modellers will do for aviation.

"I am thinking particularly of the study of dynamic stability, since that is my field. The new N.A.C.A. free flight wind tunnel is the only piece of equipment in the country for studying the total effects on dynamic stability of various airfoil and fuselage and tail combinations. A carefully built gas model, however, carrying a clock-work control system and a set of small recording instruments could be built for thirty dollars which would give information and data which aeronautical engineers are now sadly lacking. Spin tests and slipstream effects, power off and power on stability can all be studied.

"Gas models should be subject to some sort of regulation, yes, but banned unconditionally never."

Mr. J. William Knepp of 106 East 3rd Street, Lewistown, Pa., makes some interesting comments, as follows:

"I want to tell you that I have never heard of anything more absure than the arguments used against gas models by the person or persons who are trying to stifle this interesting phase of model building.

"These persons ought to know that anybody who builds gas models usually puts a lot of work on them, and that to fly them where they are apt to hit anything or anybody would be ridiculous. I don't think gas model builders would fly their planes anywhere that it is evident they might crash into an obstruction."

Mr. Knepp also remarks on a feature of design of his ship, the Quaker Flash, which is interesting. He says:

"On test flights the ship showed a decided tendency to spiral dive. I corrected this by designing a smaller rudder for the ship. Since mounting the smaller rudder my model has shown no such tendency."

His is a common way to correct the spiral diving tendency. However a large rudder will not be as effective in causing spiral diving if the center of lateral area is approximately on a horizontal line with the center of gravity.

CLASSIFIED DIRECTORY

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CHRISTMAS GIFTS for modelbuilders. 30" flyers: Stinson Reliant, Monocoupe 90-A, Macchi Castoldi, Mister Mulligan, Waco Y-O-C, Curtiss Seahawk. Each 50c postpaid. Six for $2.50 postpaid. No C.O.D.'s. accepted. New 1938 catalogue sent free. H & F Model Airplane Co., 459 Bristol Street, Brooklyn, New York.

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DISTRIBUTOR of Model Airplanes, Boats, Trains, etc. Delivered to all parts of N. Y., Nrkn. & L. I. All Standard Makes. Direct to your place of business at attractive discounts. N. Y. Model Airplane Distrib. Co., 1787—68th St., Bklyn, N. Y.

CANADIAN MODEL BUILDERS & Dealers—Free insignia sheet with new price-list. Send 3c stamp to Super-Craft Products, 10 Rockcliffe Blvd., Toronto, Ont.

CHAMPIONS Weigh Their Models. Be a Champion. Beam Scales, assembled 50c. Weigh to 1/1000 oz. American Aircraft Supply, 174 George St., New Haven, Conn.

RUBBER Thread—brown or gray—Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago office: 412 South Wells Street. Dealers and Manufacturers only.

YESKA WOOD—lighter than balsa, 2 to 5" diameter, 25c per foot postpaid. Sample, stamp. Luis F. Viera, Ponce, P.R.

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SEND 5c for our list. Indexes: Full Size plans for 360 different types of Flying Models; 110 for Gas Jobs; Six Page "Low Speed Aerodynamics," etc. Jones Co., Box 31, West Brighton, S. I., New York.

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WANTED Original Poems, Songs, for immediate consideration. Send poems to Columbian Music Publishers Ltd., Dept. 146, Toronto, Can.

It's a SENSATION!

COMET

COMET *presents* *The* GRUMMAN *Gulfhawk*

A MESSAGE *from Al Williams*

Happy landing, fellows! Yes, and many happy hours while you're building this swell model of the GRUMMAN GULFHAWK. I know you will have a lot of fun building it, and flying it, because the method of construction outlined in the plan is so simple. It's a mighty faithful reproduction of the Grumman ship which was designed and built especially for my use. Go to it fellows and once more I say happy landings!

(Signed) AL WILLIAMS.

EXACT SCALE—1" = 1'0"

A SENSATIONALLY complete model of the Grumman Gulfhawk which was made to order for Al Williams! At every stage in the designing of this kit, the blue prints and details supplied by the Grumman Aircraft Corporation were closely followed. No guess work—no compromise—everything had to be perfect—and it is! All controls movable from cockpit. Landing light controlled from cockpit. Cockpit hood slides; shock absorbing tail wheel swivels and retracts. Landing gear also retracts. Many parts furnished complete or semi-complete; shaped struts, completed gas tank, shaped tail block, wheels and leading edges, even a decalcomania that dolls up the finished model like a million dollars! Highest quality selected Balsa and other material. Generous quantity of dope. A typical Comet value at only **$3.95**

Order from your dealer.

ENTER THE SCRIPPS-HOWARD GRUMMAN GULFHAWK CONTEST! $250.00 IN PRIZES—PLUS SPECIAL COMET AWARD!

Watch your local Scripps-Howard newspaper for details of the Grumman Gulfhawk model-building contest, with Al Williams as judge. $250.00 in cash prizes—and a special Comet award to the winners built from Comet kits! Here's one contest you want to be sure to enter—and you want to be just as sure to use the Comet kit for best results!

The COMET GAS MODEL

FEATURES: DETACHABLE wings and tail assembly. Wings "give" in event of collision, to protect them. ADJUSTABLE RUDDER and elevator setting. ADJUSTABLE MOTOR SKID accommodates practically every motor on market. Thrust line can be varied. SHOCK-ABSORBING LANDING gear and tail wheel—exclusive with Comet. Prolongs life of model by absorbing landing shocks. Monocoque type, used by newest transports, chosen because of light weight, structural strength, and ease of construction. CURTISS ROBIN chosen because of unusual inherent stability and excellent flyability. MOTOR SKID gives in event of collision—protecting motor. REMOVABLE COWL and hatches for easy accessibility to motor, battery and wing springs.

SPECIFICATIONS

MODEL—Curtiss Robin

WINGSPAN—6 feet

OVERALL LENGTH—46"

WEIGHT OF MODEL—2 lbs. less motor

Power—any 1/5th or 1/6th H.P. motor

WHEELS—3½ in. air wheels

A SENSATIONAL VALUE

$4.95 less airwheels and motor

$6.50 with airwheels less motor

Postage—east of the Mississippi, 30c; west of the Mississippi, 50c; none if ordered from Comet Dealer.

KIT—$2.50

BIG MONEY'S WORTH!

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A new group of Comet scale models that every model builder will go "nuts" about! Full size, highly detailed plans drawn to exact scale. Lots of life-like realistic details; many finished and semi-finished parts, aluminum cowls, hinged controls, and a generous quantity of dope. Choose your model—then go ahead and have the time of your life building it!

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Kit No. X-13—Boeing P-26-A
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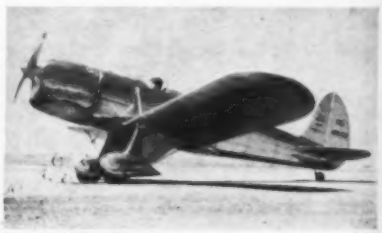

Kit No. X-15—Ryan ST
Wingspan 18¾", length 13⅜"—$1.50

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All Designed to Cleveland's New $\frac{3}{16}$" Scale and $\frac{1}{8}$" Gage

Average over all sizes, Locomotives, 12"-17"; Passenger Cars, 15"; Box Cars, 8"; height, 2½".

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RB-8	Texas & Pac.—40 ft. wood auto	.45
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RB-11	Union Pac.—50 ft. steel	.55
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RF-3	B&M—46 ft.—55 ton	.25
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These Kits are all dry—no cements or colors are included with them. The models they build are known as Representative (Rep) models. By simply employing working couplers, ready soon, detaching the dummy trucks, and replacing them with actual working trucks, all your "Rep" (cars only) models can be used as your "Super Model" layout. This line of models shall be known as the C-D DE LUXE LINE.

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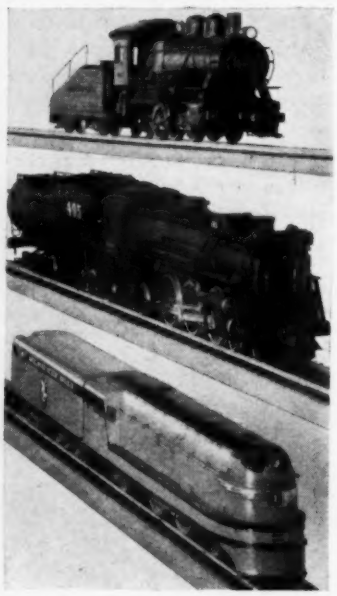

This revolutionary new idea in model railroading—the C-D All-A can scale and gage—is creating more than a sensation. Model roaders simply can't get over its simplicity, its ease of building simple scale of 1/64" to one foot, its remarkable realism, its gre vantages in reduced layout space, and its ridiculously low price. airplane enthusiasts are getting just as great a "kick" out of reality we've taken all the finesse we've developed in our mod plane experience and applied it to interesting, fascinating railro Boy, even if you think you're not interested in building railroad type gets you. Yes, we really mean it. And one of the really gre tures about it is that you can keep adding to what you've already it keeps growing and getting more interesting all the time—"has over" the older gages.

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★ 4. All necessary strips, blocks and pieces to c the entire locomotive tenders or cars.

★ 5. All fill in materials to realistically simul metal or solid wood construction as it appears prototype.

★ 6. All wire, special printed, lettered and detai ering paper, screws, escutcheon pins, axles includ etc., etc.

★ 7. And last, but most important of all, included Kit is a completely detailed full sized, copyrighted tic Rep drawing, enabling you to make each mo easily by the easy model design methods work far more easily made than might be believed.

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